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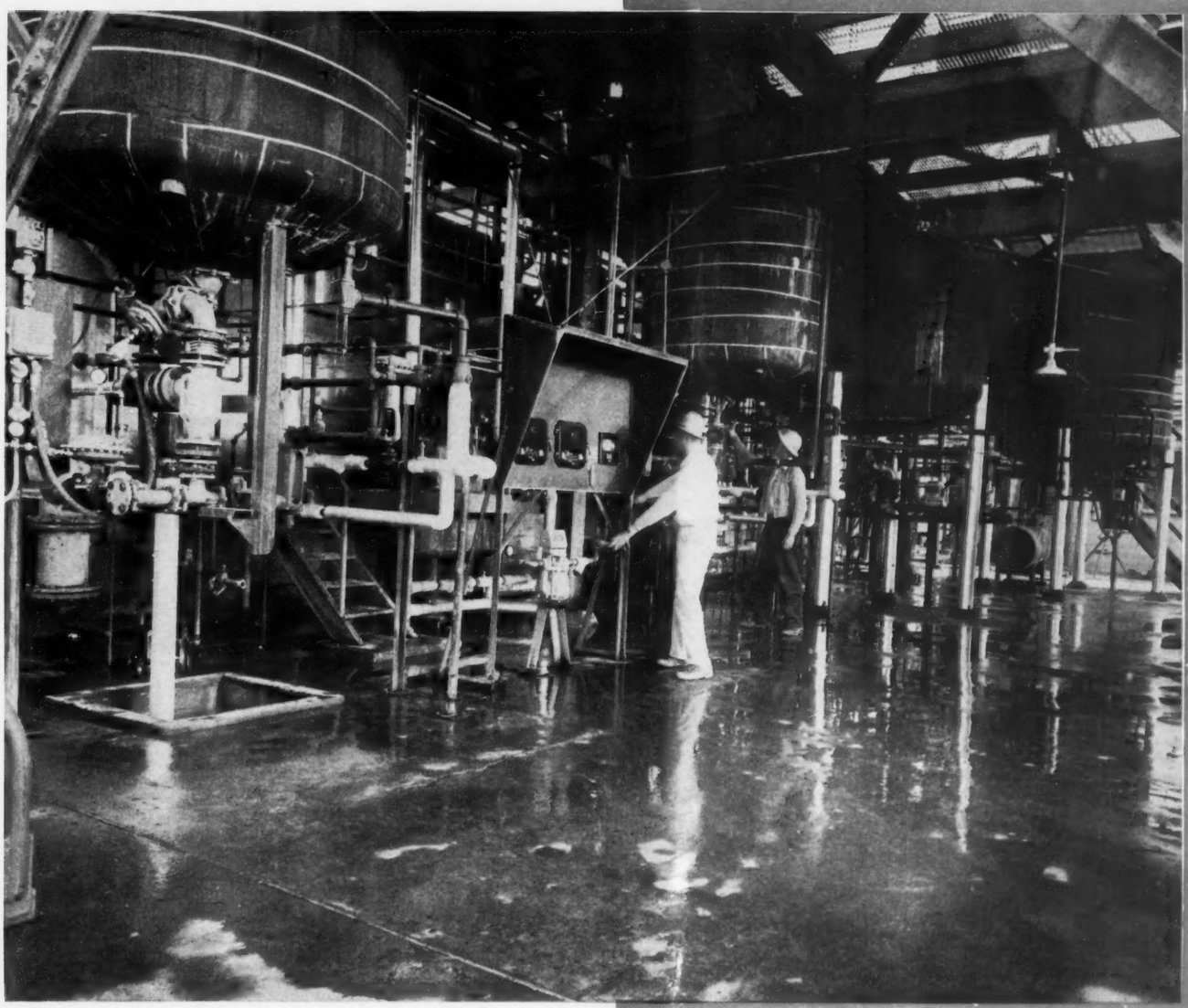
PRODUCTION EDITION

for Manufacturers of Chemicals for Agriculture



REACTORS AND CONTROL PANEL at Stauffer Chemical Company's Trithion plant at Henderson, Nev. See page 2.

INSIDE YOU'LL FIND:

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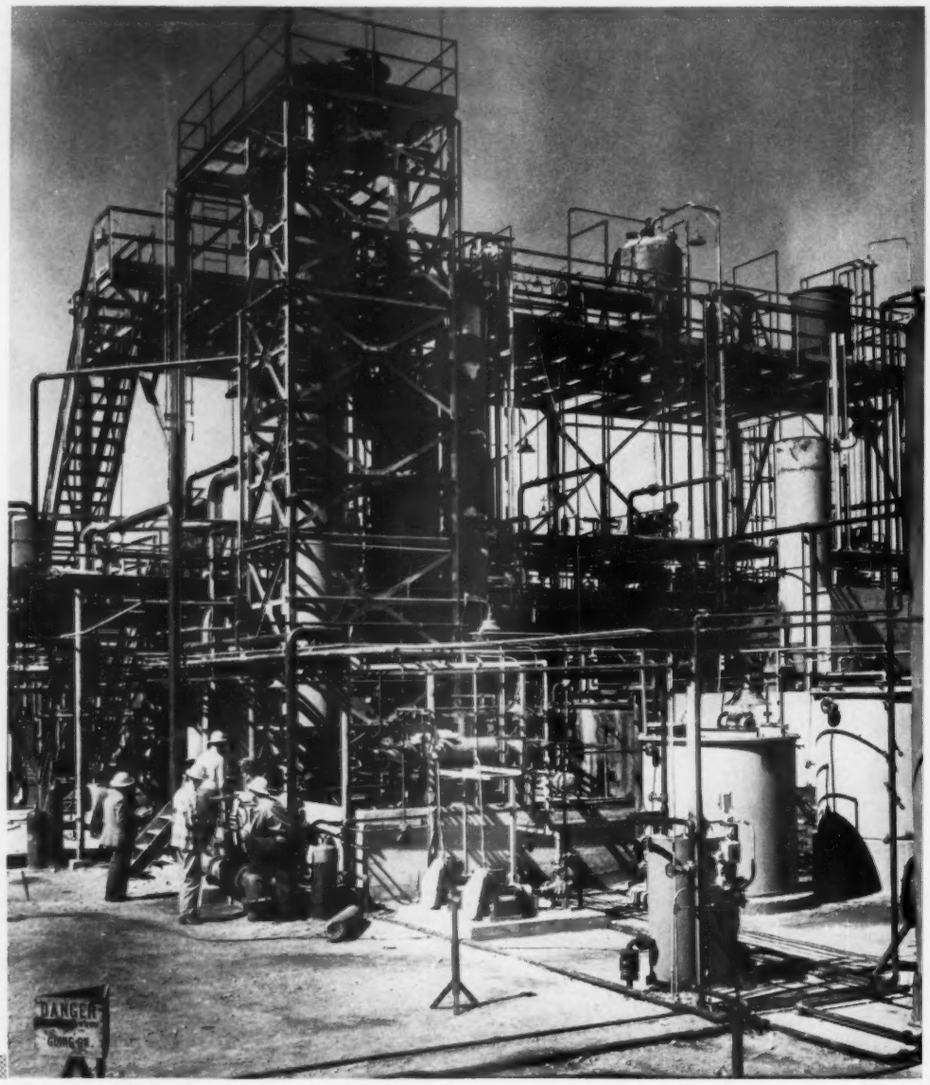
Pesticide Unit . . .

Nevada Plant Plans Opening In February



GENERAL VIEW of Stauffer Chemical Company's new Trithion plant at Henderson, Nev. Plant is scheduled to begin production about February, 1960.

STAUFFER CHEMICAL expects to have its new thiol unit on stream at Henderson, Nev., early in February, 1960, the company reports. The $500,000 facilities will increase by about 50% the output of thiol for production of Trithion. The innovation will enable Stauffer to operate the Henderson facility on an integrated basis, whereas at the present time, thiol is shipped to Henderson from Niagara Falls, N.Y. Output of the new unit will be about twice that of the Niagara Falls plant.

Although the firm has not made public the nature of the manufacturing methods for making thiol, it has stated that the process is different in many important respects from existing steps in production of the chemical. Because of economies expected to accrue with the Henderson plant, the facilities at Niagara Falls will cease to manufacture thiol and will be utilized for other purposes.

Company spokesmen stated that by building the new plant around the improved process, costly modifications that would have been required to update the Niagara Falls plant were avoided.

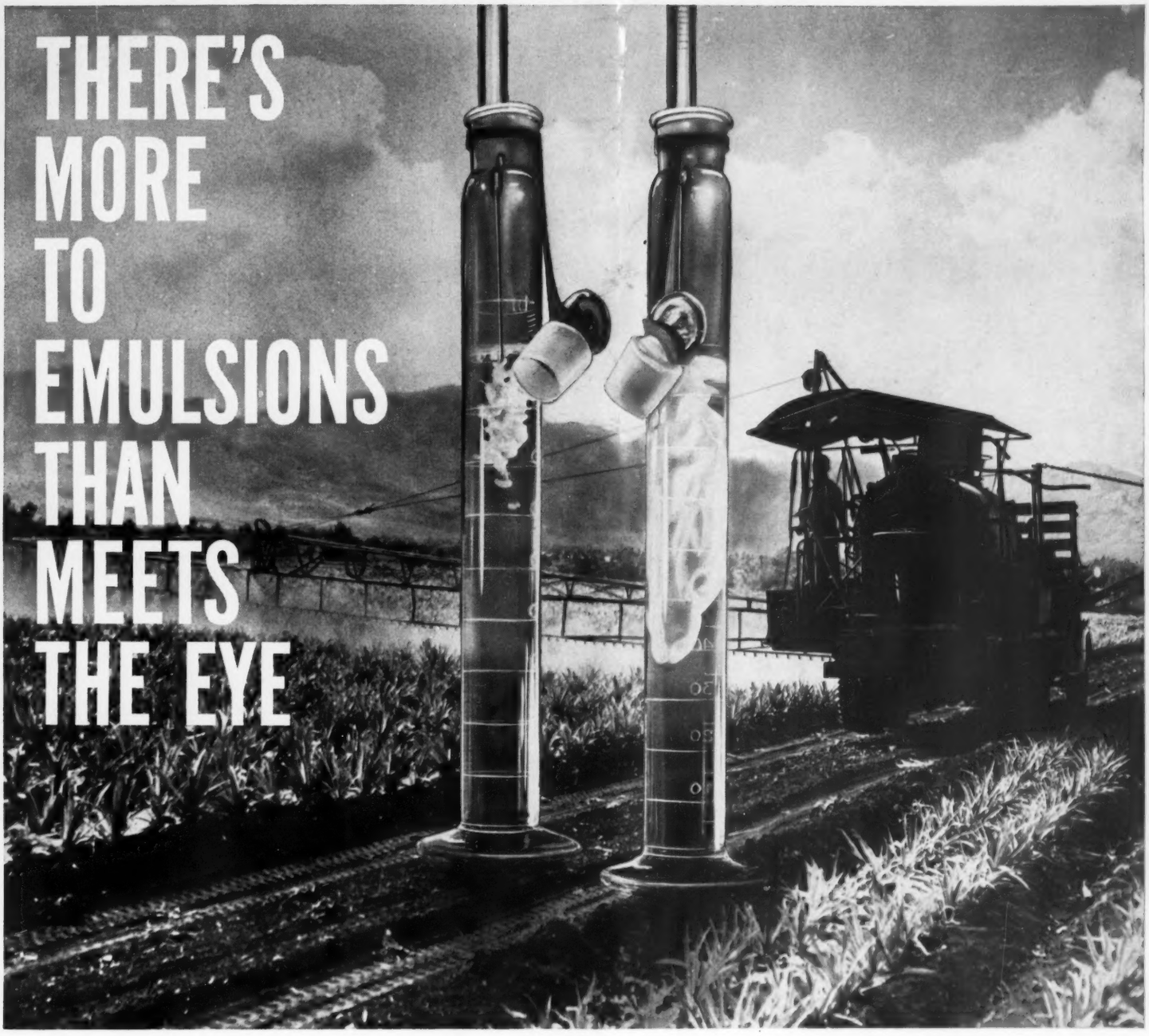
Aside from manufacturing considerations, the company says that the integration of intermediates processing with the production of finished products at the same location are important factors. Such an arrangement avoids freight costs required for interplant transfer of the intermediate and enables production management to hold a tighter rein on the allocation of manpower and production scheduling.

Manufacturing processing for production of Trithion is also not known outside the company. At least two patents cover the Trithion synthesis, and details have not been made public. However, it is known that the finished product is obtained by conventional distillation techniques, and all equipment used in the process is lined with glass.

Control of toxic fumes is complete, with the vapors being piped off to a point some distance from the plant, where fumes and vapors are burned completely to prevent the escape of any pollutants which might be of dangerous nature. The plant has equipment for continuously monitoring the lines to detect immediately any escaping fumes.

The Henderson plant started production in February, 1958. Sales volume has increased sufficiently to warrant the additional production facilities, company spokesmen say, and the new plant will double the original capacity to produce.

To supplement output of Trithion, Stauffer is making a study of various analogs, such as Methyl Trithion, currently being field tested. This methyl analog is reported to have shown promise, particularly for possible use in combination with Trithion to control pests not entirely covered by the latter product alone.



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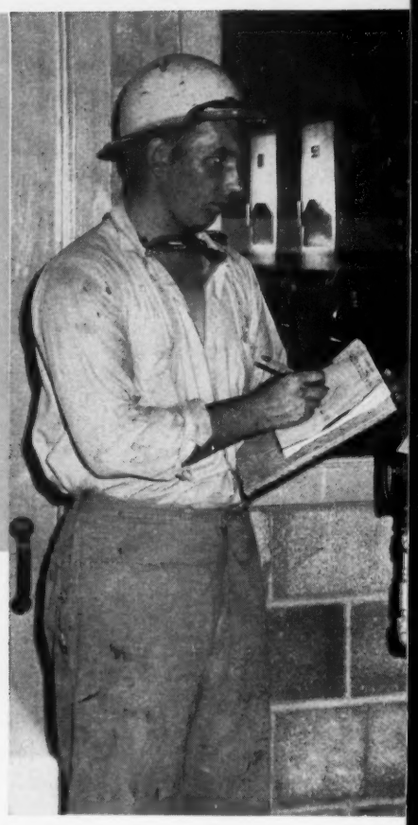
Canadian Granular Plant Boasts Latest Production Devices



ONE OF THE most modern granular fertilizer plants to be seen anywhere is the Chatham, Ontario, plant of Canadian Industries, Ltd. This facility, designed and equipped by A. J. Sackett & Sons Co., Baltimore, receives dry premix materials from an adjacent plant. A constant weigh-feeder sends the material into the ammoniator, first unit of the granulating process. The fines are returned to the process at a constant predetermined rate so they are incorporated into the finished fertilizer product.

In the rotary ammoniator, sulphuric acid, nitrogen solution or anhydrous ammonia is added in varying amounts according to specifications. Water is added as required to produce granule formulation. Recording charts in the control room show the operator the exact quantity of each liquid entering the ammoniator at all times. Flow of these liquids is automatically regulated by control valves at a preset rate. The signal panel in the operating control room indicates when any phase of the process is out of specified operating limits by visual and audio alarms.

Partial granulation takes place in the ammoniator. The fertilizer discharged from the ammoniator is carried by a chute to a granulator where it is subjected to a further rolling action. The resulting granules, still very moist, are carried down a chute to the dryer, revolving drum 60 feet long and eight feet in diameter, located on the ground floor.

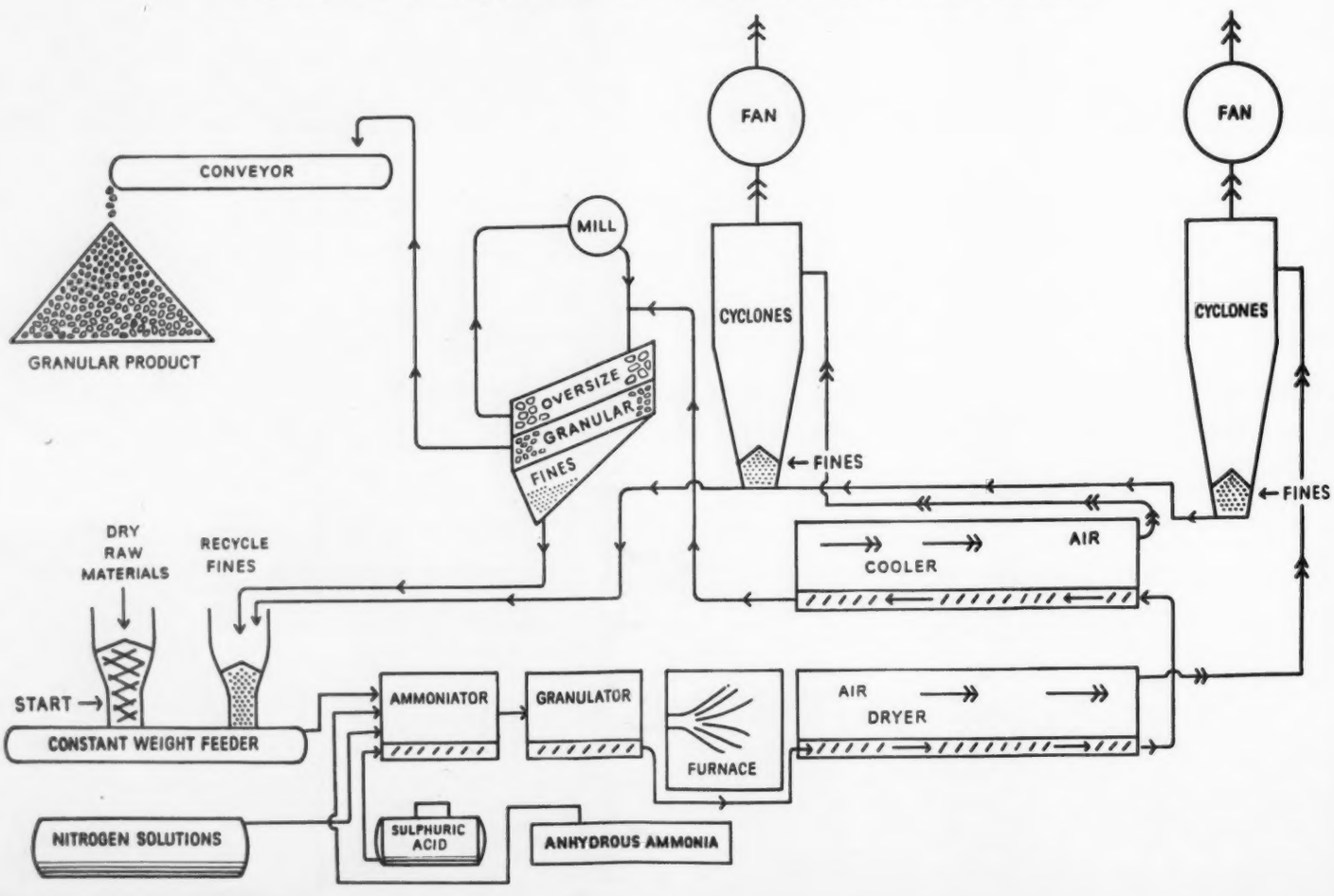
The forepart consists of a gas-fired furnace which heats air to a temperature of approximately 1,000° F. This blast of super-heated air is pulled through the dryer by a large fan. By the time the granules emerge at the far end of the dryer—20 minutes after they enter it—they are hard and dry with a temperature of 200° F.

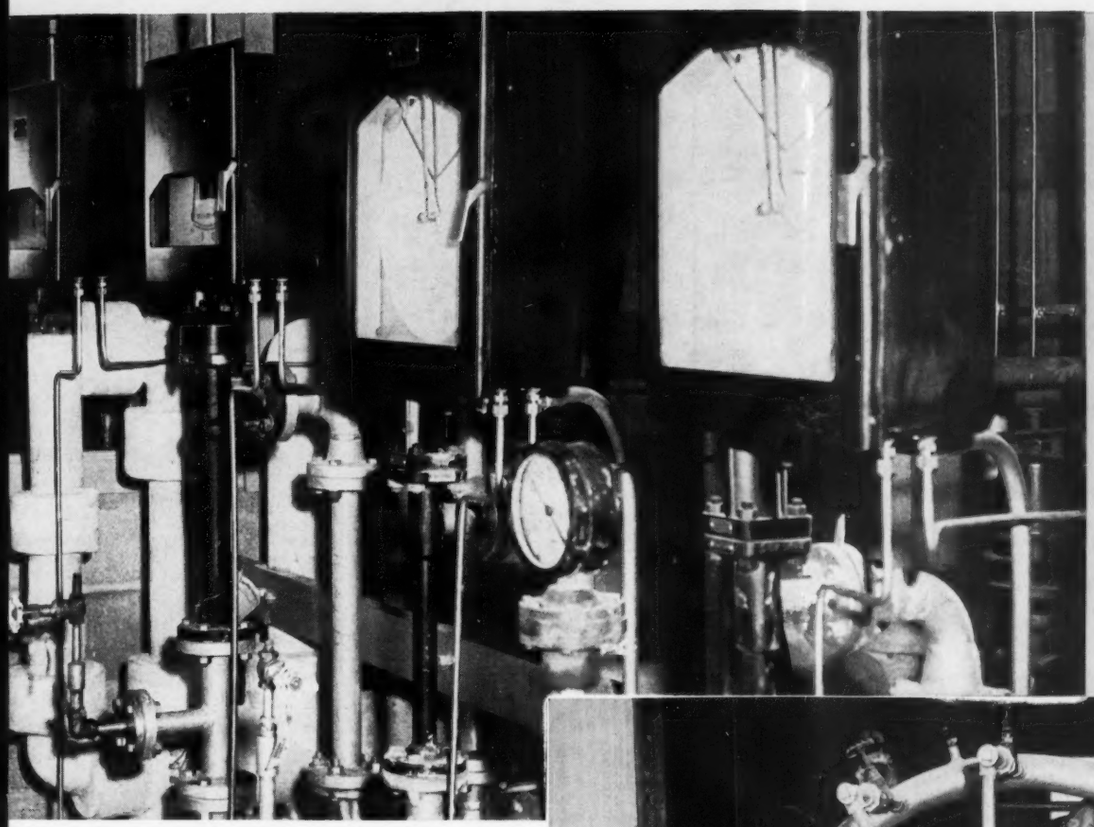
Too hot for storage bins, the granular fertilizer on leaving the dryer is transferred by an elevator to the adjacent cooler, a revolving cylinder the same size as the dryer. As the fertilizer passes through, it is cooled to atmospheric temperature by great volumes of air drawn through the cylinder by a large fan.

To secure a desirable range of particle sizes, the cooled fertilizer is elevated to the top floor of the plant and passed through air-swept double deck screens. Here, oversize particles roll off the top screen and are taken to a chain mill which breaks them down to smaller size and returns them to the screen. Granules ⅛ inch in diameter or smaller fall through the top screen onto a second screen. Correct sized granules roll down this screen and fall through a chute to the second floor and then onto a conveyor belt which takes them to storage in the adjoining building.

Smaller particles (fines) fall through this screen down a chute to the hopper feeding the constant weight fines feeder on the first floor

Chart 1—Flow Sheet, Canadian Industries, Ltd., Chatham, Ontario





RECORDING CHARTS — Operator checks 24-hour recording charts in Canadian Industries, Ltd. plant at Chatham. These gauges record flow of water, sulfuric acid, nitrogen solutions and anhydrous ammonia into ammoniator on an every-minute-of-every-day basis. Control room is entirely automatic.

from which they are recycled through the granulating system.

The Canadian plant is equipped with an elaborate dust reclamation system. Dust created by the movement of fertilizer in the dryer and cooler is drawn through large cyclones (three to each cylinder) and fumes from the ammoniator and granulator, where the main chemical reactions occur, are drawn through a Venturi scrubber to remove the fumes and prevent air pollution. The dust separated in the cyclones is conveyed by screw conveyor to the fines recycle hopper where it joins the fines from the screen being returned to process.

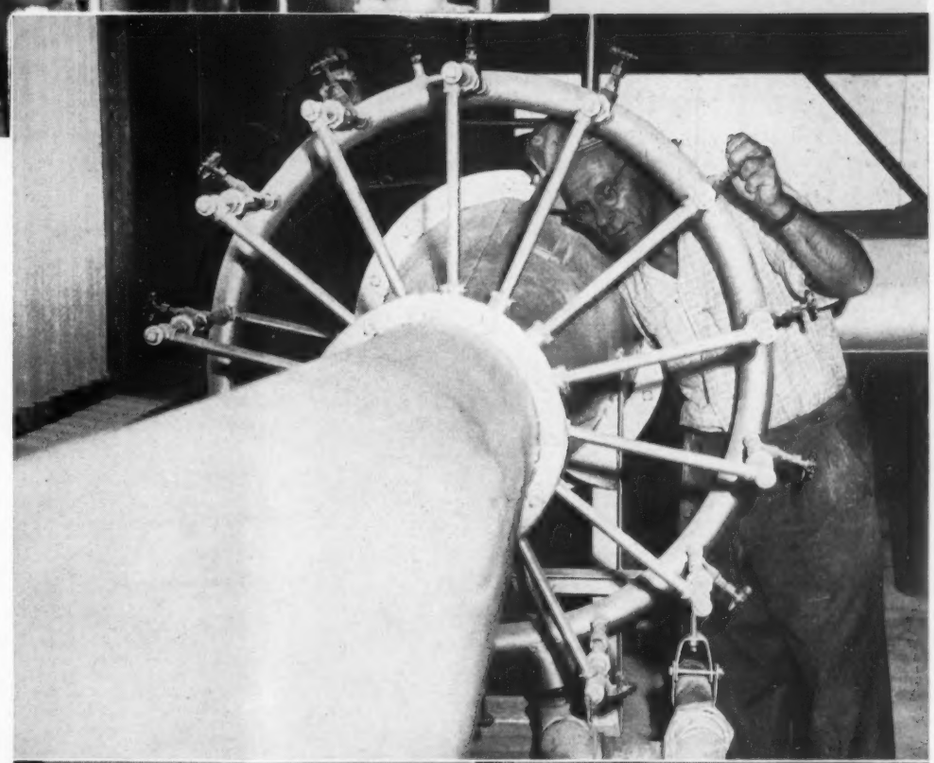
Particular care was taken in the design of the plant to reduce corrosion to a minimum. All steelwork has been protected with asphalt chromate emulsion paint. All process flow control equipment and electrical control equipment are housed in separate control rooms supplied with clean filtered air heated as seasonally required. A particular feature of the electrical installation was the use of poly-vinyl coated conduit throughout the building.

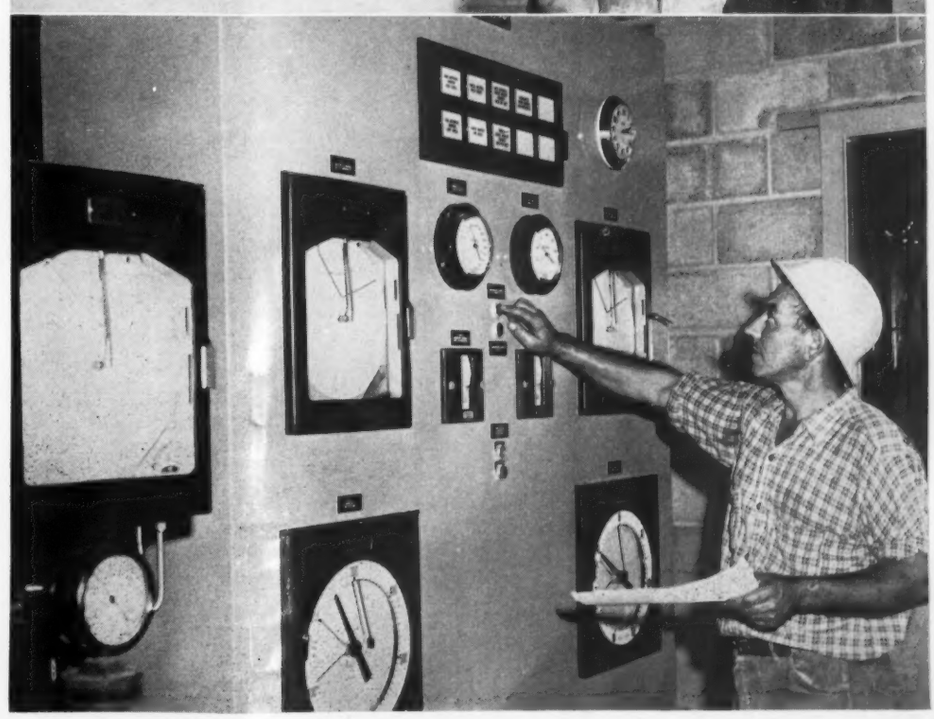
The granular fertilizer is shipped out in 80-pound polyethylene-lined bags carrying the trade name "Super-Flow" or in trucks for bulk application.

In addition to the plant at Chatham described here, Canadian Industries also operates almost identical plants at Ingersoll, Ontario and at Hamilton, Ont. Except for minor details, the plants are duplicates of each other, according to company spokesmen.

The chemical industry in Canada had its birth with the discovery of calcium phosphate in the Lievre River district of Quebec in 1829. Later deposits were found in other locations, and the first fertilizer plant on record was established at Brockville, in about 1871, with the second plant opening in 1889.

Canadian Industries, Ltd., entered the fertilizer business in 1910 when a predecessor company purchased the superphosphate operations of the Victoria Chemical Co. and transferred them to James Island, British Columbia.





INSIDE GRANULAR PLANT—At right, plant personnel at Canadian Industries, Ltd. keep a close check on all phases of production. Above, Venturi scrubber removes undesirable fumes from gases formed in process. At right is panel in control room of CIL's granular plant. The status of every phase of the process in shown here at all times. Operator keeps a close watch on temperature and pressure gauges.

NEWS DIGEST OF THE WEEK

Central Chemical Buys Delaware Company

BRIDGEVILLE, DEL. — Central Chemical Corp. has purchased the inventory and equipment owned by Newton Chemical and Supply Co., Bridgeville, Del. The arrangement became effective Oct. 1. Central Chemical Corp. will continue to supply the farmers and farm supply dealers in southern New Jersey, Delaware and the Peninsula counties of Maryland and Virginia with quality agricultural chemicals, operating from the office and warehouses formerly used by Newton Chemical and Supply Co.

John L. Coyle, Jr., will serve as manager of the Bridgeville office of Central Chemical and will be assisted in sales and field service by Frank Boys. Both men are well known in the area and previously served in such capacities with the former management.

Central Chemical Corp. operates throughout New York, Ohio, Pennsylvania, Maryland, Virginia, West Virginia and New Jersey and this new sales office will be number eleven for the company.

Crown Zellerbach To Build Chemical Plant

SAN FRANCISCO, CAL.—Crown Zellerbach Corp. is beginning immediate construction of a chemical complex at its Bogalusa, La. pulp and paper mill site, it was announced in San Francisco by Reed O. Hunt, president.

Scheduled to begin operations early in 1960 is a dimethyl sulf-oxide plant with an annual capacity of five million pounds. Dimethyl sulf-oxide (DMSO) is a powerful industrial solvent, finding uses in a variety of synthetic fibers, agricultural chemicals, insecticides, paint strippers, brake fluids, and in petroleum refining processes.

Higher Capacity Plant Replaces Former Facility

MOUNT DORA, FLA. — A new $250,000 plant replacing the one destroyed by fire about a year ago is now in production by the Citrus Culture Corp.

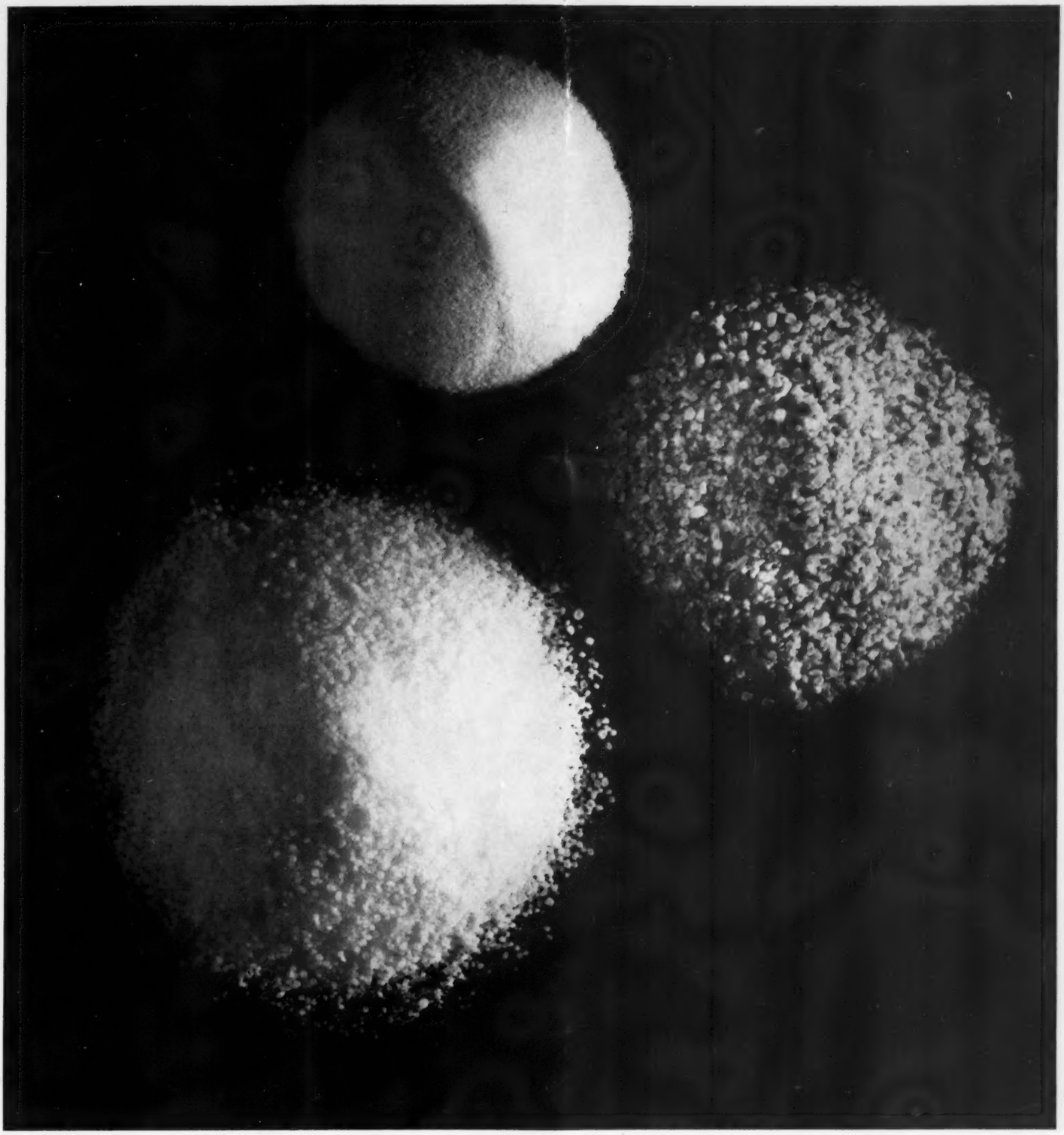
The plant's capacity has been increased. It is now equipped with a ton and a half mixer and can produce one third more than the capacity of the old one. J. E. Fortner, president, said the plant's production can now go as high as 200 tons daily.

Located in a more fireproof building on the east side of town, Mr. Fortner also pointed out that it is equipped with a sprinkler system.

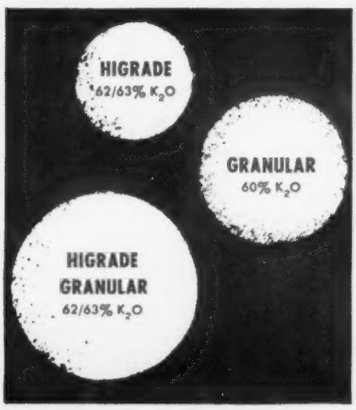
In addition to the production of fertilizer the company also does a business in caring for orange groves. Twenty five to 30 persons are engaged in this work.

James G. Link, Jr.

AGRONOMIST—James G. Link, Jr. has been named a southern regional agronomist for the American Agricultural Chemical Co., it has been announced by Dr. D. P. Satchell, manager of agronomic services for the company. Mr. Link was awarded a M.S. degree in agronomy by Alabama Polytechnic Institute, Auburn, last June. His work leading to the master's degree concerned the residual effects of applied phosphates, and was conducted under Dr. L. E. Ensminger at API. Mr. Link will headquarter at Montgomery, Ala.



Better fertilizers begin with three grades of specially sized USP potash



To help you make better fertilizers, USP offers *three* outstanding grades of muriate of potash—each ideally sized to meet current fertilizer manufacturing requirements. Two white grades—Higrade muriate and Higrade Granular muriate—each contains 62/63% K_2O, and each gives the most potash per ton for mixed fertilizers. And USP's Granular muriate, containing 60% K_2O, is ideal for fertilizers requiring a still larger particle size. All three grades are specially refined to resist caking and remain free-flowing throughout.

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Diamond Names Personnel For Production Positions

CLEVELAND, OHIO—Recent appointments at four locations, designed to strengthen technical activities within the chlorinated products division of Diamond Alkili Co. were announced by Harry S. Weiner, manager of operations for the division.

Z. A. Stanfield, technical superintendent at the company's Belle, W. Va. plant, transfers to the Greens Bayou plant in the Houston, Texas, area in the same capacity. This is a newly created position at this plant.

Named to succeed him at Belle as technical superintendent, is D. R. Pulver, senior engineer with the technical staff of the division in Cleveland.

Replacing Mr. Pulver on the technical staff is V. C. Cayton, a process engineer at Diamond's Deer Park, Texas plant since March, 1955.

Moving into Mr. Cayton's vacated post as process engineer at Deer Park is G. E. Taylor. He joins the division, having recently completed the company's year-long engineering training program.

Mr. Stanfield joined Diamond in August, 1956, as an engineer in the central engineering department. He became technical superintendent of the chlorinated products division at the Belle plant in September, 1957.

A graduate of the University of Tennessee, Knoxville, Tenn., where he earned his B.S. degree in chemical engineering, Mr. Stanfield worked for the Tennessee Valley Authority for 12 years in chemical process development before coming to Diamond.

Mr. Pulver started in June, 1952, as a junior engineer in the development section of Diamond's research department, Painesville, Ohio. He transferred in March, 1957, in the same capacity, to the chlorinated products division at the Painesville plant and a year later, to Cleveland. In June, 1958, he advanced to engineer and in August, 1959, became senior engineer.

He is a graduate of Cornell University, Ithaca, N.Y., where he earned his B.S. degree in chemical engineering in 1952. He served with the U.S. Army from 1954 to 1956.

Mr. Cayton came to the Diamond organization at Deer Park in December, 1954. From the works engineering department there, he transferred as a process engineer to the chlorinated products division in March, 1955.

He earned his bachelor's degree in chemical engineering from the University of Texas, Austin, in 1943, then spent the next 11 years with other chemical companies in his field of specialization.

Mr. Taylor went into Diamond's engineering training program in August, 1958, upon graduation from the University of Texas. For the past year he trained as a junior engineer at Deer Park and at Painesville.

Liquid Fertilizer Plant Moves to New Location

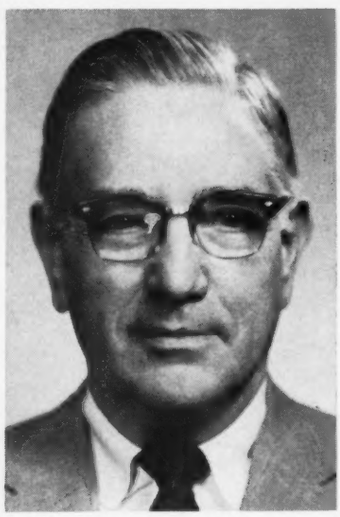
CHENEY, WASH.—The liquid fertilizer plant here which had been operated by the Ratcliffe Implement Company for several years until its purchase early this year by the Green Acres Soil Service, is being moved from the Ratcliffe used equipment lot on the south edge of the city to a location two blocks further south and across the Northern Pacific tracks.

The Green Acres Soil Service, which has the Elephant Brand liquid fertilizer franchise in the farming areas of Cheney, Reardan, Spokane, the Spokane valley and Rathdrum, Idaho, area, is owned by Albert J. Burgad and A. Dean Dinnison.

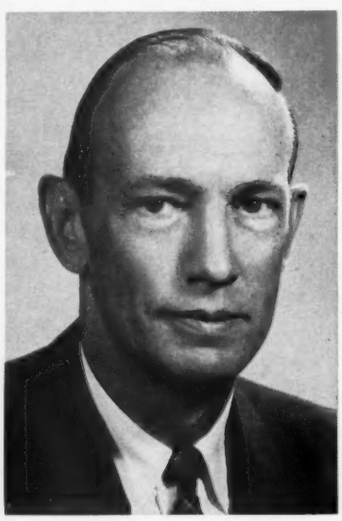
The new Cheney plant will store six basic liquid fertilizers and will be able to mix additional complete fertilizers.

Agronomist Appointed

LOUISVILLE, KY.—Lewis B. Williams, Jr., has been appointed chief agronomist of Federal Chemical Co. He has been agronomist for the Nashville division of the company since 1953. Prior to that time he traveled the central states area as a fertilizer distribution analyst for the TVA. He holds B.S. and M.S. degrees in soils from the University of Tennessee.



John R. Sargent

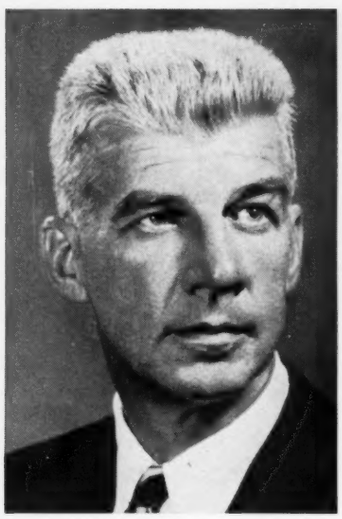


William M. Newman

NEW APPOINTMENTS — Federal Chemical Co., Louisville, Ky., has announced the appointments of two executives in its sales department. John R. Sargent has been made senior vice president for sales, and William Morris Newman was named vice president for sales. Mr. Sargent has been with Federal Chemical since 1915 and has been vice president for sales since 1945. Mr. Morris was until recently vice president and treasurer of Price Chemical Co.

PRODUCTION Man of the Month

Shoulders Firm's Ammonia Output Responsibility



Albert M. New

MEET ALBERT M. NEW, vice president and director of production of Escambia Chemical Corp., Pensacola, Fla., production man of the month. Mr. New, a native of Weldon, North Carolina, is responsible for his company's output of ammonia, ammonium nitrate, nitrate solutions, nitric acid, polyvinyl chloride and methanol.

Mr. New has had many years of experience in the chemical field, although he has held his present position at Escambia only since Nov. 3, 1958. He received his bachelor of science degree in chemical engineering from the University of North Carolina in 1934, and his master's degree in chemical engineering from the University of Michigan three years later.

The production director began his business career as a development engineer for the Carbide and Carbon Co. of South Charleston, W. Virginia, and was subsequently transferred to Texas City, Texas, where he became director of process development.

In 1956, he joined Escambia Chemical Corp. which had begun production at its Milton, Fla., plant late in 1955. The Escambia plant employs approximately three hundred persons.

Mr. New, his wife and three children reside in Pensacola where he is active in local civic affairs.

Manager Appointed

WILLCOX, ARIZ.—Frank M. Feffer, Sr., of Phoenix, president of Arizona Fertilizer & Chemical Co., has announced appointment of Ken Tipling as manager of the plant here.

Saskatchewan Potash Tests High, Report Says

WINNIPEG — Saskatchewan commercial ore grades 25 to 35% pure potash, W. J. Pearson, geologist for the Saskatchewan mines branch, told delegates at the annual western meeting of the Canadian Institute of Mining and Metallurgy recently. This is reported to be higher grading than that received by ores mined in New Mexico or Europe. New Mexico ore grades from 20 to 25% and in Germany, ores are graded from 10 to 20%. The New Mexico mines were discovered in 1925. Prior to their finding, Germany was the sole source.

The first potash in Saskatchewan was discovered in the southeast of the province in 1943 and later in the west central section. The potash deposits in Saskatchewan run northwest from North Dakota and southwest Manitoba to eastern Alberta in the area known as the Elk Point Basin.

Mr. Pearson also said that there are now 153 potash exploration wells in Saskatchewan, 45 of which have been drilled since the first month of 1959.

Named Research Manager

TRONA, CAL.—Dr. Donald S. Arnold has been named manager of research at American Potash & Chemical Corp.'s main plant at Trona, Cal., according to an announcement by Joseph C. Schumacher, AP&CC vice president in charge of research.

Mr. Arnold succeeds Dr. Donald E. Garrett who resigned from the company recently to enter his own business.

Mr. Arnold previously was head of the high energy chemicals section of the AP&CC Henderson, Nev., plant research laboratory.

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W. R. Grace Signs Management Contract With Gonzalez Chemical Firm of Puerto Rico

NEW YORK, N.Y.—W. R. Grace & Co., New York, and Gonzalez Chemical Industries, Inc. of Puerto Rico, have signed a contract under which Grace will manage and operate the Gonzalez ammonia and ammonium sulfate plant at Guanica, Puerto Rico.

The management contract is a first step in a contemplated reorganization of Gonzalez Chemical Industries, Inc., in which it is expected that Grace will acquire a substantial amount of stock in the Puerto Rican company. Negotiations to this effect are continuing.

Under the management contract, Grace will supply managerial, administrative and technical personnel, technical know-how and production services.

The Gonzalez plant was designed and built by the Lummus Co. in 1956. Design capacity is 125 tons a day of ammonia and 350 tons a day of sulfuric acid from which over 400 tons a day of ammonium sulfate is produced as fertilizer for the island's agriculture.

The plant, built at a cost of more than $12 million, is the first and only ammonia from crude oil. Grace also Puerto Rico and was built to make the island more self-sufficient as a basic chemical producer for industry and agriculture.

The plant utilizes crude oil as a starting material. It is one of the world pioneers of the Texaco Partial Oxidation Process for manufacturing ammonia fom crude oil. Grace also uses this process at its 300 tons a day ammonia plant in Memphis, Tennessee, but employs natural gas as a starting material.

The Gonzalez plant converts sulfur into sulfuric acid employing the Leonard-Monsanto process. Grace uses this sulfuric acid process at its own superphosphate plants in Bartow, Fla., and Curtis Bay, Md. It also will use this process in an ammonium sulfate plant now being completed in Trinidad.

The plant will have an excess capacity of aqua ammonia and sulfuric acid which have many important industrial uses for the expanding industrial economy of Puerto Rico.

Several top officials of the Grace Chemical Division at Memphis, Tennessee, a major producer of ammonia and urea, were appointed to key positions at the Gonzalez plant. They assumed their new duties at Guanica immediately after signing the contract in New York.

William J. Haude, president of Grace Chemical Division, announced that under the contract all production matters will be supervised by John G. Carriere, vice president of the Grace Chemical Division. Harold S. King, controller of the same division, will handle financial and organizational matters.

The following appointments were made:

Lloyd E. Lundahl, formerly manager of engineering and maintenance of the Grace Chemical division at Memphis, is the new manager of the Gonzalez plant.

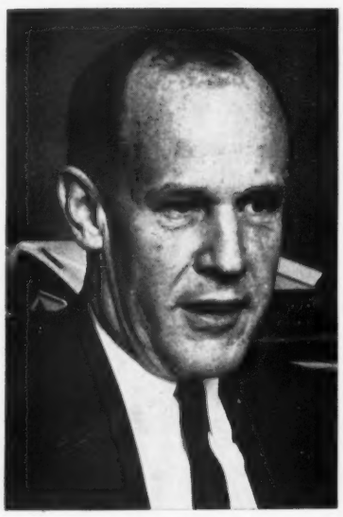
E. H. Culp, previously assistant manager of the ammonia department at Memphis, is assistant plant manager.

C. L. Weeks is project manager, C. P. Rhys operating superintendent, and D. S. Sharpe, until now manager of maintenance at Memphis, is superintendent of maintenance.

Peter D. Chabris, assistant director of industrial relations of W. R. Grace & Co. (Caribbean Area), is in charge of industrial relations.

Lab Blast Kills Two

KENVIL, N.J. — An explosion in the Kenvil research and development plant of Hercules Powder Co. took two lives and injured five on Oct. 5. Hercules spokesmen said the blast was from an explosion of solid propellent fuels on which research is being made. The mishap was entirely unrelated to the company's work with toxaphene or nitrate fertilizers, it is reported.



J. Paul Ekberg, Jr.

Monsanto Forms New Product Executive Post

ST. LOUIS — Monsanto Chemical Co. has established a new executive position of product director for agricultural chemical compounds in its organic chemicals division. J. Paul Ekberg, Jr., of St. Louis, former assistant director of sales planning for the division, has been appointed to the new post.

Robert M. Morris, Monsanto vice president and general manager of the division, said that rapid growth has made the position of product director necessary. The division's total sales have more than doubled during the past 10 years, he said. Sales of agricultural chemicals have been growing at an even more rapid pace, he added.

As product director, Mr. Ekberg is administratively responsible for both the continuing growth and profitability of the division's agricultural chemicals program. He reports to the assistant general manager and is responsible for planning, recommending, coordinating and evaluating the efforts and results of the division's research, development, engineering, manufacturing and sales functions in behalf of agricultural chemicals.

QUESTIONS—ANSWERS

From You — From Experts

QUESTION: "We have trouble with excessive agglomerates in granulation of pesticides. In attempting to find the cause of this condition, we have experimented with changing the temperature of the impregnating liquid and also tried to adjust the nozzle placement, but haven't as yet hit on exactly the right combination. Could you give us some suggestions?"

ANSWER: The forming of agglomerates when making granules is most likely caused by the impregnating liquid getting on the mixer surfaces such as blades, walls and cover. This causes buildup, which hardens, then breaks away into pieces which are not very easily broken down.

Another cause, of lesser importance, could be poor spreading quality of the liquid due to the formulation or a slow mixer speed. Advice on the speed of "tumbler" mixers should be furnished by the manufacturers of such machines. A "ribbon" blender should have a speed of about 400 to 500 linear feet a minute. Many formulators apparently prefer to introduce the liquid into the moving granules as fast as practical and kept off the machine parts as much as possible.

QUESTION: "Our company is considering switching to granular formulations. What are some of the factors involved particularly pitfalls to be avoided?"

ANSWER: Before undertaking actual commercial manufacturing of granular materials, it is advisable and less risky to make small laboratory quantities first in order to arrive at a correct formulation. The right absorption must be attained and if after absorption is complete the granules are a little sticky or tacky flowability can be improved by adding a little silica powder (0.25 to 2.0%). This powder should be kept at the minimum so as to not increase the "fines" or dustiness any more than is necessary.

The most important quality of a granular is good flowability, that is, uniform flowability. The applicator calibrates his equipment to a certain rate of flow or application of so much active material per unit of area. If flowability is good the tendency to cake in the bag will be greatly reduced.

Next, the trade wants as little fines material as possible. The applicator does not want to see dust in any of the handling or application. But at the same time, it is necessary to have some fines present, otherwise flowability would be poor. There is a wide difference in the sieve analysis of various granular materials from the different manufacturers. The formulator should strive to keep the fines (less than 60 or 80 mesh) as low as possible.

There is a difference in the stickiness of various active pesticide materials. This is possibly due to different rates of congealing which is sometimes corrected by sufficient cooling and delayed bagging.

If bagged while too hot, soft caking in the bag may occur when cooled and aged. Most pesticide materials will give little trouble in this respect if correctly formulated.

The present trend is toward larger particles of the inert carrier. It must be remembered that the larger the particle size the less particles there are to the pound and the resulting coverage will be less. A small difference in sieve size makes a great difference in the number of particles per unit of weight. A mesh size of something like 20 to 60 should be satisfactory. The amounts finer than 60 mesh should be low and anything over 20 mesh would be difficult to use. The bulk of the granules should be retained on 30 and 40 mesh sieves.

QUESTION: "In our area (Southeast) competition is practically forcing us to formulate liquids instead of dry insecticides. We will be formulating toxaphene, DDT, and some of the organic phosphates. Could you give us an idea of what some of the basic equipment is that should be considered for making liquids?"

ANSWER: Any complete answer to this problem must be qualified on the basis of the volume to be produced and the budget on which the plant is being operated. For amounts of a few hundred to a thousand gallons, batches may be measured by weight, making up to total weight with solvent according to the pre-determined gravity in the laboratory. Probably the best way to handle this is to have the mixing tank on a scale. In large scale production, automatic metering of the solvents is used instead of weighing.

The mixing tank should be jacketed so heat may be applied to hasten solubility of the solid pesticide. It is desirable to have the kettle made of some inert material recommended by the pesticide manufacturer for his product; however, if water is not present in the formula and equipment costs are limited, plain iron kettles may work all right. Of course, mixing or stirring must be provided and "portable mixers" should be considered.

Liquids should be turned out clean and clear. This may be accomplished by settling and drawing off upper portion or filtering. For large scale production settling would, no doubt, be too slow and probably waste would be more. In any case, foreign particles should be strained out and this is best done at the filter. The best type of filter would be the "press" or plate type.

Suitable storage tanks for the bulk solvents should be available so materials may be purchased in tank or truck quantities to obtain the most favorable price.

No heat is needed, nor should it ever be used on the organic phosphate insecticides. The fumes are too toxic. It is generally agreed that emulsifiers should be added to the cooled mixture, that is, they should not be subjected to heat.

If flammable fumes are present, motors, switches, lights, etc., should be of the explosion proof type.

Flash temperatures of the solvents should be of serious concern and proper precautions taken when needed. Toxaphene and DDT will be relatively easy but most of the organic phosphates are very toxic. There is a saying that "If you can smell the organic phosphate ester, it is too much."

Some closed system should be had for these compounds, one where the material is never seen, never handled in open containers. Finally, the filling and labeling equipment needed will be determined by the size and kind of packages required.

QUESTION: "Some of the men in our plant are afraid of the toxicants they work with, yet they will take chances such as not wearing protective masks if hot weather makes it uncomfortable to do so. How can we change this attitude, short of waiting for an accident to happen as an example? Is this istuation a common one?"

ANSWER: Safety and health measures not only help the firm but are to a large extent for the benefit of the worker. There is a great difference in the toxic effects of the various poisonous insecticidal materials. Not considering the older ones, the chlorinated compounds are in one class and the organic phosphate esters in another. The former are slow acting and insidious. They build up in the body, cumulatively. They can damage the liver, kidneys and other internal organs. Fumes are not particularly a hazard but inhalation of the dust should be avoided.

The toxic effects of organic phosphates are more spectacular since they are more acute, although subsequent exposures may add to previous ones. With these there are some warning signs and if the exposure has not been too great, recovery is rapid. But, the rule must be:

Take No Chances
Obey the Safety Rules

The worker should be advised that wearing a mask, when working with these poisonous materials, is for his own protection. Wearing a mask is admittedly uncomfortable for many people and it is quite common for workers to avoid wearing them. But when it is necessary, it should be strictly compulsory that masks be worn, subject to dismissal if the rule is disregarded.

The foreman has to get tough about this. Workers will ultimately get used to the idea but at first it may be a little difficult. Men in the plant exposed to any of these poisonous materials during their work should be allowed time for taking a shower at the end of the day and to change to clean street clothes. Contaminated work clothes should never be worn outside the plant.

In case of a gross contamination, a prompt change to clean clothes must be made. Eating, chewing or smoking should not be allowed in the work areas. These rules are

Turn to **QUESTIONS** page 31

EDITOR'S NOTE

Questions presented here are typical of many asked by people in the trade. To answer these queries, Croplife has referred them to Lee Ayres who made a practical study of formulation techniques during a career of nearly 40 years with McConnon & Co., Winona, Minn. We invite further questions from our readers, and urge use of the coupon below for this purpose. Fill it in, fold over so address is on the outside, staple, and mail. No postage is necessary.

Dear Editor:

Here is our production problem which we would like to have discussed:

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Question-Answer Editor

Arcadian® News

Volume 4 | For Manufacturers of Mixed Fertilizers | Number 10

The No. 1 Need of Most Crops

More N in N-P-K

Consumption of all three major plant foods has risen rapidly in recent years, as farmers use more fertilizer to produce higher yields per acre. But, yields and profits from fertilizer are still far below the maximum returns that can be produced with fertilizer.

The reason is simple. Most crops do not get the amounts and analyses of fertilizers they need to produce optimum yields and profits. *The average fertilizer is far too low in nitrogen.* In addition to failing to supply the nitrogen needs of crops, it also limits the efficiency of its phosphorus and potash content because these plant foods cannot function properly without sufficient nitrogen available to crops.

The leading fertilizer-consuming crops need more nitrogen than any other plant food. Corn, wheat and cotton require more than twice as much nitrogen as phosphoric acid, and much more nitrogen than potash. Modern grazing and hay crops are big users of nitrogen. Animal products produced on farm-grown feeds remove from the soil more nitrogen than phosphoric acid and potash combined.

Yet, in 1957-58, the plant food content of the average mixed fertilizer was 5.95% N, 12.55% P_2O_5, and 11.76% K_2O. If this analysis was used on corn, cotton and wheat, it would supply only about one fourth of the nitrogen needed to balance its phosphoric acid and potash.

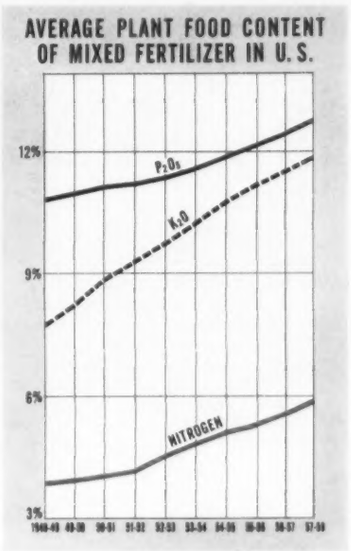
Challenge and Opportunity

In the same year, total consumption of materials and mixed goods accounted for 2,292,000 tons of phosphoric acid and 1,935,000 tons of potash. The 2,284,000 tons of nitrogen used was only about one-third to one-half of that needed to balance the other plant foods in supplying crop needs.

And, experiment stations tell us that crops could use much greater amounts of phosphoric acid and potash efficiently and profitably, if these plant foods were balanced with sufficient nitrogen.

It is true that conditions vary. Some crops and soils need more nitrogen than other crops and soils. But the national picture clearly indicates that low-nitrogen content is the chief limiting factor in the ability of the average mixed fertilizer to produce maximum yields and profits.

This situation is a challenge and an opportunity to every fertilizer man. It calls for vision, progressive enterprise and hard selling. Start now to make it your aim and purpose to manufacture *really* complete fertilizers that contain enough nitrogen in balance with other plant foods to produce the best possible return per dollar invested by the farmer. Success in attaining this goal offers rich rewards to you and your customers.



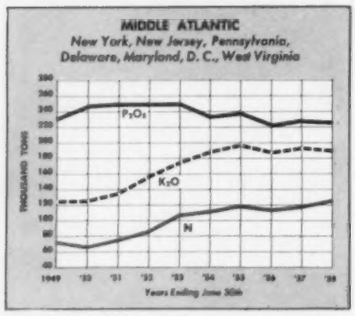
New Ammoniation Techniques

Today it's easier than ever before to put more N in N-P-K. High-quality, high-analysis, high-nitrogen mixed fertilizers can now be manufactured efficiently and economically through the use of new, improved ammoniation techniques. For complete information, contact: Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y.

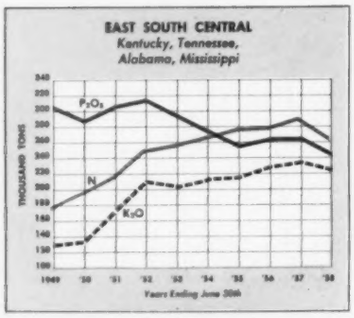
More N in N-P-K can help you sell more and better fertilizers that pay bigger profits to you and the farmer.

TOTAL PLANT FOOD CONSUMED BY EACH AREA OF THE U.S.

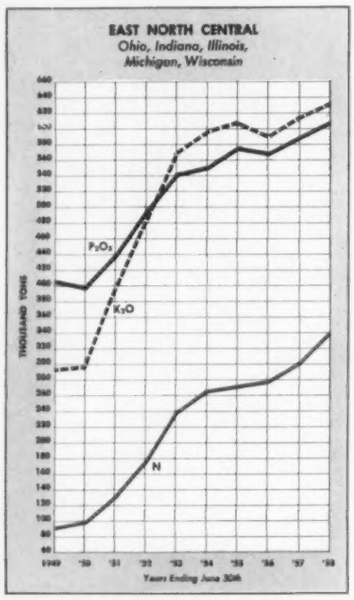
These charts graphically portray the ratio of the three major plant foods for each area of the country, based on figures for total consumption including both mixed fertilizers and straight materials. The figures for the area or areas in which you operate will be helpful to you in assessing the present situation and in making plans for the future. Most of these area charts indicate big potentials for more N in N-P-K.



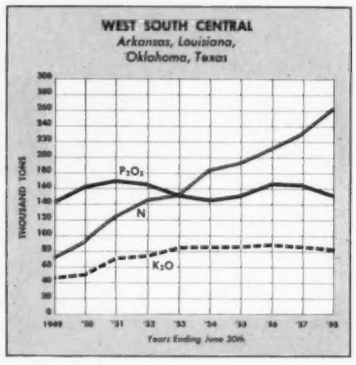
MIDDLE ATLANTIC states have many sections in which high-phosphate fertilizers have built up a soil reserve of this plant food. In New York and New Jersey especially, high-nitrogen fertilizer can make crops get up and grow profits, just as in New England. Since both of these Northeastern areas are traditional users of mixed fertilizer, high-nitrogen combinations fit easily into the sales pattern.



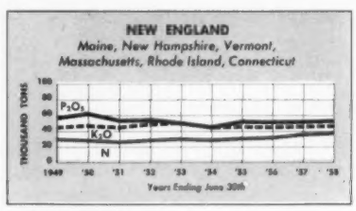
EAST SOUTH CENTRAL states, with the exception of the Mississippi Delta area, are low in fertilizer use. The intensive Delta cash crop area has taken to heavy use of nitrogen and high-nitrogen ratios of plant food. While financing has been no problem on these large farms, the reverse is true on most of the typical small farms of these states. More work to show the value of fertilizer to banks and other groups who are financing farmers can pay off well for fertilizer men.



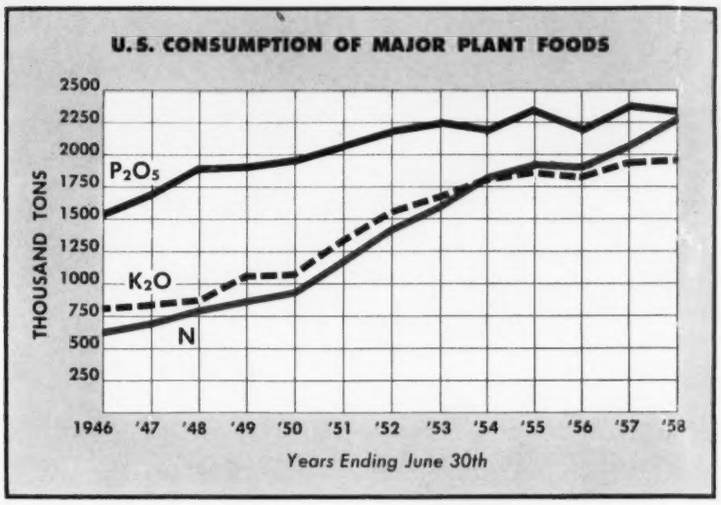
EAST NORTH CENTRAL states show an amazingly low level of nitrogen in fertilizer in proportion to phosphoric acid and potash. In this new fertilizer area, use of all three plant foods is increasing fast, but far more nitrogen is needed to boost crop yields at lowest cost. With intensive cropping of land on the increase, there is a big opportunity to sell more 16-8-8 and other concentrated mixes for grain and grass crops. Experiment stations are beginning to recommend more nitrogen, and legumes cannot furnish it economically. Balanced starter fertilizers should also come fast, with the new planter attachments available.



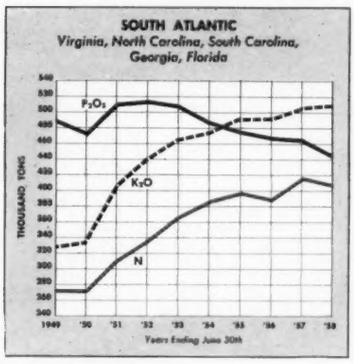
WEST SOUTH CENTRAL states have many large commercial producers of cash crops who have realized the value of balanced fertilizer, as the chart indicates. The use of plant foods has improved fast, and is producing profitable yields of cotton, rice and other crops. Extra sales can be made by demonstrating to the smaller farmers of the area that they too can make money by using a larger tonnage of fertilizer.



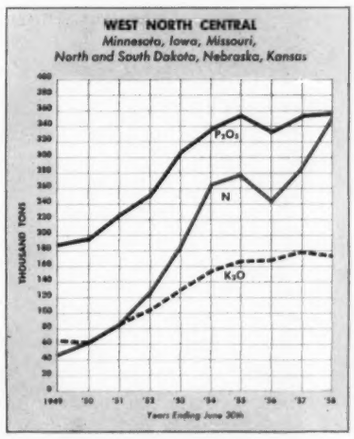
NEW ENGLAND soils, with a few cash crop exceptions, are now mostly in grass



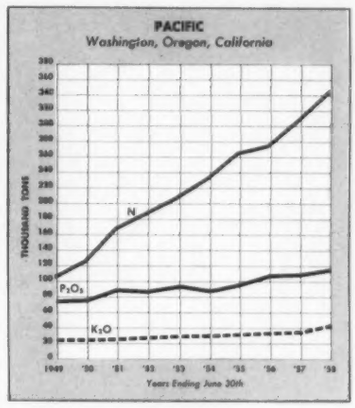
and grass-legume mixtures. Traditional use of nitrogen on these old soils has been small. Heavy use of superphosphate has built up a reserve of phosphoric acid in the soil, without greatly increasing yields. On these fields, high-nitrogen fertilizer can make grass yields jump. It can help grass make good use of the phosphorus in the soil and help reverse the downtrend in sales of phosphoric acid in fertilizers. In much of this area, high-nitrogen fertilizer for grass enables this crop to compete economically with legumes in feed produced per acre.



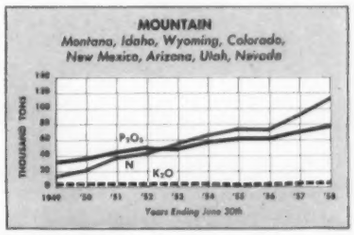
SOUTH ATLANTIC states, with the exception of highly-fertilized tobacco, citrus and vegetable areas, also show similar accumulation of phosphate reserves in the soil. Crop yields are low, indicating the need for more plant food of all kinds. With livestock numbers expanding, grass is becoming the big crop, and nitrogen is far less apt to be lost through leaching. Midland and Coastal Bermuda, Bahia, Pensacola and other grasses are a major new market for high-nitrogen mixed fertilizers. And Georgia, for example, aims to grow enough corn for all its cattle and poultry. If farmers move up from 23 bushels per acre, their present average, to 100 bushels per acre on 2,700,000 acres, they will use a lot of fertilizer.



WEST NORTH CENTRAL states are new in fertilizer use, but recent increase in tonnage has been rapid, especially in Missouri and Nebraska. Use of nitrogen is proving profitable on range grass as well as irrigated meadows, corn and other cash crops. Missouri is using considerable nitrogen in proportion to phosphoric acid and potash. Soil supplies of potash have been naturally good in some areas, but heavy cropping will deplete them. Nebraska, with a 3-to-1 ratio of N to P_2O_5, has found heavy use of nitrogen profitable. High fixed costs on irrigated land and rapidly rising land values in the entire area have made more intensive cropping vital. This calls for more fertilizer, especially nitrogen, to cut costs per unit of crop production.



PACIFIC COAST states have taken to fertilizer in a big way, especially California. The combination of irrigation, sunshine and intensive cash crops on large farms has built fertilizer tonnage fast. This area shows the best use of nitrogen in proportion to other plant foods to fit crop needs. It is the nearest to a model area on balance of nutrients. Perhaps some fertilizer men in this area can demonstrate the economies of a balanced mixed fertilizer compared to the practice of using straight materials.



MOUNTAIN states have a wide variety of farm and ranch conditions. Fertilizer use is heaviest in irrigated areas. Balanced fertilizer in ratios to fit the crop and soil conditions can make bigger profits—whether on the range, in mountain meadows or on cash crops.

MODERN CROPS NEED MODERN FERTILIZERS

FARMING is undergoing a revolution in this country. Farms are growing bigger and modern, labor-saving, money-making methods are being rapidly adopted. Yet, many farmers continue to use old-fashioned amounts and ratios of fertilizer. By failing to know and supply the plant food needs of their crops and soils, they limit their return from land, labor, seed and machinery.

The time is ripe for a change to modern fertilizer practices and it is up to the fertilizer industry to help to speed that change. The manufacturer who supplies the farmer with easy-to-use complete fertilizers carefully designed to fit his particular needs helps both himself and his customer to prosper. This requires an accurate knowledge of the exact needs of crops and soils . . . efficient formulation and manufacturing techniques, using modern methods and materials . . . and aggressive promotion, education and selling.

Farmers and farming areas that break with tradition and use improved fertilizer practices are far ahead of the average in yields and profits. And fertilizer manufacturers who foster these improved practices are usually far ahead of the average in sales and profits.

Because the average mixed fertilizer is so low in nitrogen, you can take a giant step toward improved fertilizer practices in your area by producing, promoting and selling grades that contain sufficient nitrogen to supply crop needs for big yields. Many fertilizer manufacturers have found that it pays to double and triple the nitrogen content of mixed fertilizers for certain crops.

It Pays to be Progressive

Ten years ago, who would have suggested 320 pounds of nitrogen per acre of corn, even on irrigated land. Thousands of Nebraska farmers now use it and produce 150 to 200 bushels of corn per acre.

What agronomist 10 years ago would have advised more than 600 pounds of nitrogen per acre of grass. Georgia and South Carolina farmers now use two or more tons of 16-4-8 fertilizer per acre of Coastal Bermuda grass and produce 10 tons or more dry-weight, high-quality forage per acre.

Even timothy hay in the Northeast, once a one-ton, once-a-year crop of low feed value, is now producing four tons of high-protein hay per acre plus months of after-growth grazing, with high-nitrogen mixed fertilizer.

The Pacific Coast states, especially California, use the highest ratio of nitrogen to other plant foods, and California leads all other states in average corn yield, 75 bushels per acre, as compared to 60 for Iowa and 50 for the U. S.

Outstanding Results

Wherever states, counties or individual fertilizer companies have stepped out and really tried to do a better job of supplying the actual plant food needs of crops and soils, results are outstanding. Georgia is an excellent example. In Wisconsin and other corn states, where "prescription" fertilizing has been tried, it is building big yields and big fertilizer sales for entire counties.

New machinery is encouraging the use of heavier applications of high-analysis, high-nitrogen fertilizer. An excellent example is the new planter attachments that apply starter or row fertilizer to one side and deeper than the seed. In tests, 1,000 pounds of 10-10-10 per acre was applied to corn by this method without seed damage. 3-12-12 and 4-16-16 are not efficient when you can supply all the nitrogen the crop needs with one application of high-nitrogen complete fertilizer. One sale replaces two.

For many crops, high-nitrogen mixed fertilizers are now sold in competition with low-nitrogen mixtures plus top-dressing or side-dressing materials. One application does the work of two, saving labor for the farmer and increasing the volume and the profit of the manufacturer and the dealer. Off-season and bulk spreading is just as practical with high-nitrogen mixed fertilizer as with any other material. The era of legumes in short rotations is disappearing as many farmers find it more profitable to buy high-nitrogen fertilizers rather than to spend a year growing a legume crop.

Alert manufacturers and their salesmen and dealers are using soil tests, tissue tests, plant food removal charts and field demonstrations to promote high-nitrogen mixed goods designed to meet exact needs.

The need for nitrogen is nation-wide. It's the No. 1 need of most crops. This need will be supplied with high-nitrogen complete fertilizers or with low-nitrogen mixtures plus straight materials. It will pay you to take the initiative. Start now to sell more N in N-P-K!

Pesticide Emulsions Undergo Change as Materials Improve

By S. K. Friedman*

PROBABLY NO AREA of agricultural chemistry has seen a more striking advance in technology than that of emulsifiers for liquid pesticide concentrates. Hardly an emulsifier in use today existed five years ago.

Emulsions considered excellent in 1954 are now mostly unacceptable. Then a formulator was pleased with a relatively coarse-grained emulsion based on 6 to 10% emulsifier in his DDT concentrate. Today, he expects 3% emulsifier to produce an emulsion that looks like milk.

In years past, the manufacturer could never be certain that 8 to 10% emulsifier in his concentrate would allow a one-season carryover. Today, using 3% emulsifier, he is sure of at least two years of shelf life.

The research skills that created this revolution are now used to solve problems considered impossible a few years back. For example, today's farmer can mix insecticide emulsifiable concentrates directly with liquid fertilizer in one spray tank and apply both at one time. Wide-range emulsifiers that function in the very high salt concentration of liquid fertilizers were unknown five years ago.

Inventory problems, too, have been considerably eased. The formulator used to be burdened with an inventory of about ten emulsifiers—almost one for every pesticide he sold—plus a few special items for customers that might use soft well water instead of the harder water from the local river. Now, with "matched-pair" emulsifiers, over twice the number of pesticides can be formulated with only a few emulsifiers. As a bonus, these products will work in nearly all the different waters that the applicator is likely to encounter.

The formulation of emulsifiable concentrates of current large-volume insecticides and weed-killer is, basically, a simple process. The toxicant is dissolved in a hydrocarbon solvent and an emulsifier is added to permit the emulsification or dispersion of the solution into water. Three considerations, however, complicate the choice of an emulsifier. They are: Economics, the wide variety of raw materials used, and application practices.

Economics require the emulsifier to be the most efficient available for each formulation. Reducing the emulsifier concentration means reducing emulsifier costs. Almost invariably, greater savings are realized through reduction of the use level of emulsifier than is possible through reduction of emulsifier price. The critical factor governing the economical use of emulsifiers, industrial as well as agricultural, is the proper balance, or ratio of its components.

Agricultural emulsifiers in particular are highly "sophisticated", containing as many as 10 or 12 components in precise ratio. If the components of an emulsifier are not properly balanced, higher use levels are required for satisfactory performance. In some instances, the wrong ratio can mean that the emulsifier will not work at all, no matter how much is used.

The wide variety of raw materials used in formulating pesticide concentrates poses another problem. In general, each responds differently to emulsifiers. Xylene-range solvents require emulsifiers different from those used with heavy aromatic naphtha-type solvents. A heavy aromatic-type solvent based on methylated naphthalenes responds differently from one based on alkylated xylenes.

Some pesticides have slight surface-active properties and the emulsifiers must be adjusted to compensate for them. Technical 2,4-D and 2,4,5-T esters, manufactured at different plants, may be identical in all respects except for minute traces of by-product compounds. Yet, these traces may cause widely different responses.

It is not uncommon to find that 0.1% impurity in non-agricultural

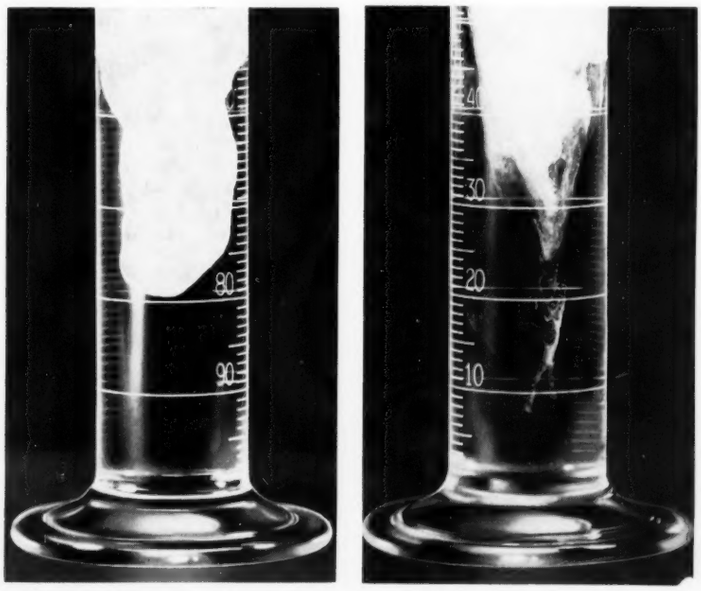
Turn to **EMULSIONS** page 31

*Witco Chemical Co., New York.

TABLE 1

General Field Requirements of Pesticide Emulsifiable Concentrates and Laboratory Test Methods Used in Their Evaluation

Field Requirements	Laboratory Test Method
1. Rapid and easy dispersion of the pesticide concentrate in the spray tank is desirable.	1. Measured by spontaneity, bloom, or flash dispersion tests. The emulsifiable concentrate is dropped from a pipette into a beaker or graduated cylinder containing water and the ease with which it disperses is observed (illustration 1). The cylinder is inverted through a number of cycles until the emulsion is homogenous. Arbitrary rating values can be assigned, or the number of cylinder inversions required to effect homogeneity can be used for ratings.
2. The emulsion should remain homogenous in the spray tank. There should be no settling of emulsion droplets which might cause uneven distribution of toxicants in the spray tank and in the applied spray.	2. Measured by emulsion stability or creaming rate tests. A homogenous emulsion prepared in a standard manner (i.e., 20 inversions of the graduated cylinder) is allowed to stand undisturbed in a graduated cylinder for a specific amount of time. The volume of cream which settles to the bottom or rises to the top is rated.
3. If the emulsion has to remain without agitation in the spray tank for a long time, such as overnight, any cream or oil which has developed should be very easily redispersed into a homogenous emulsion, for easy continuation of the spray operation.	3. The graduated cylinder containing the emulsion from step 2 is allowed to stand undisturbed from 2 to 24 hours, depending on the operating conditions expected. The cylinder is then inverted and the ease with which separated material is redispersed into a homogenous emulsion is rated.
4. The concentrate should emulsify satisfactorily in the waters found in the field.	4. Spontaneity of dispersion, creaming rate, and emulsion stability should be checked in waters representing the types encountered in the field. Generally, synthetic hard waters ranging from very soft (i.e. 50 ppm) to hard (i.e. 1,000 ppm) are satisfactory for laboratory checks.
5. There should not be incompatibility between the various components of the formulation.	5. Generally checked by shelf-aging tests. Samples should be stored in glass bottles and observed regularly to guard against sludge formulation.
6. The product shall continue to emulsify satisfactorily through the entire period during which it is stored in its finished package.	6. Shelf stability test samples from test number five should be checked regularly for emulsification. Accelerated aging tests should be run in which the sample of concentrate is held at elevated temperatures in the presence of steel.
7. Any product carried over during the winter should not develop crystallized toxicant or other material which might tend to clog spray nozzles.	7. Low temperature tests should be run on the finished concentrate. Samples should be kept at temperatures normally encountered during the winter, and seeded with toxicant to avoid supersaturation. Any material which separates at low temperatures should redissolve easily at the higher temperatures at which the concentrate will be used.
8. If the concentrate is diluted with fuel oil or their solvents before application, all the components should be compatible upon dilution.	8. Oil extendability tests should be run to guard against the development of nozzle-clogging sludges and other incompatibilities with extending solvents.



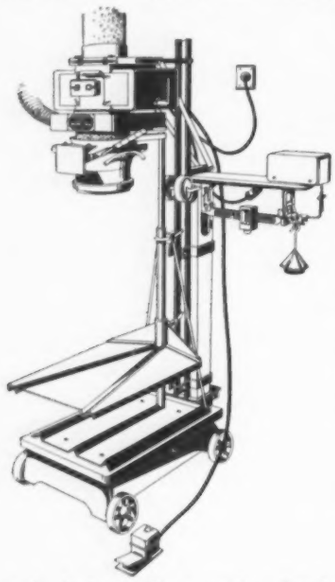
COMPARISONS—Emulsification of a concentrate being added to water in graduated cylinders. On the left is example of excellent spontaneity. On the right is cylinder with only fair dispersion with droplets of free oil settling rapidly to bottom of cylinder.

What's New?

Additional information is available about new products, new services, and literature described in this department. Circle the numbers of items on which you desire more information, fill in your name, your job title, your company's name and address on the card. Then clip it out of the page and mail. No postage is necessary.

No. 9137—Bagging, Weighing Machine

Finco, Inc., announces the "Way-Matic Bagger" is now available for general distribution. The machine is suitable for weighing and bagging



seed, feed, fertilizer, grain, chemicals and clay products, the company says. The unit handles cloth, paper or multiwall bags from five to 100 lb. or more and is able to fill and weigh six to 10 bags a minute, company literature said. The company guarantees accuracy to within 2 oz. a bushel. Check No. 9137 on the coupon and mail for details.

No. 9133—Bagging Scale Bulletin

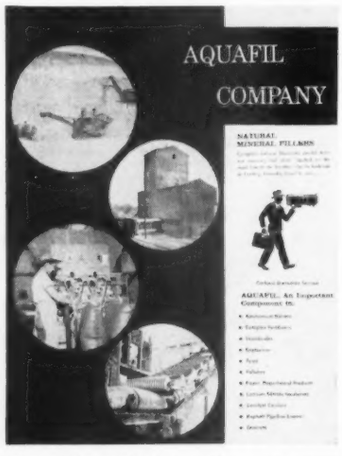
A six-page bulletin describing the Richardson GA-38 bagging scale, an automatic machine designed for high-speed loading of bags has been announced by Richardson Scale Corp. The bulletin, illustrated in color, shows close-up photos of the unit in operation and in actual installation. Both structure and function are described and specifications, including rate of operation, accuracy and capacity, are included. Special features, standard and optional, are described. A page of proportional drawings is used to illustrate details of constructions and dimensions. Other information about this scale and other Richardson equipment is included. For details, check No. 9133 on the coupon and mail.

No. 9135—Automatic Batching Control

A new method for automatic batching control has been introduced by Toledo Scale, Division of Toledo Scale Corp. The unit is referred to as "Batchboard" Remocon control, and is said by the company to afford the latest in proportioning control opportunities through automatic presetting of unlimited numbers of batch formulas. The unit eliminates the necessity for manual adjustment of individual weigh selectors to obtain the desired quantity of each ingredient in the batch. The systems are designed to provide control of the entire batching operations from a central remote location. Each unit is approximately 7 in. by 10 in. by 2 in., and contains contact holes, each hole representing a weight value. Plug wires are inserted into the appropriate holes to set up the desired batch weight of each ingredient for single or multiple scales. An individual "Batchboard" is used for each formula, and once the unit is wired, it can be used indefinitely without rewiring. Each unit is enclosed to prevent accidental change to the wiring. As many as 20 ingredients can be controlled by one "Batchboard." Each unit is numbered, representing one specific formula. To operate, a key operated power switch is turned on and the operator then selects the proper "Batchboard" and inserts it into the receptacle on the control panel. If multiple batches of one formula are to be delivered, the operator selects the number of batches desired on the preset batch counter. Any other standard Toledo proportioning control features can be integrated into a "Batchboard" Remocon system. For more complete details, check No. 9135 on the coupon and mail.

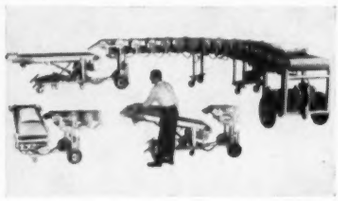
No. 9138—Diatomite Bulletin

Aquafil Co. has published a new four-page service bulletin describing the use of its product in the manufacture of insecticides, ammonium nitrate, mixed fertilizers and other chemical products. The company claims its mineral fillers have low bulk density, low moisture, chemical inertness and large surface area for use as anti-caking agents in fertilizers. The bulletin presents a complete specification sheet and full information on shipping and packaging. To receive a copy of the service bulletin check No. 9138 on the coupon and mail.



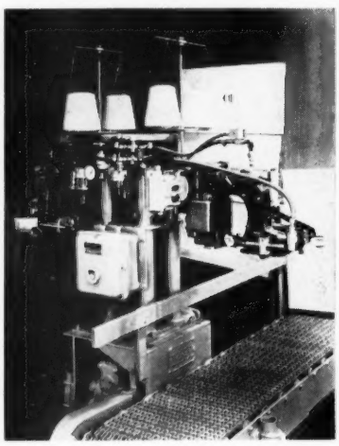
No. 9136—Stacking Belt

A high speed stacking belt, designed for use with standard Power-Curve box car and truck loaders has been announced by Power-Curve Conveyor Co. The company claims the unit can make possible one-man, push-button car loading of bags. The operator guides the bags as the conveyor stacks to full height anywhere in the car. The unit handles 30 bags per minute. The stacker and conveyor are push button controlled from the same station, advance or retreat under shuttle power without interruption of flow, the company says. The loader carries bags through box car door and into the end of the car or around pillars, corners, through aisles and doorways. For details, check No. 9136 and mail.



No. 9134—Dual-head Sewing Stand

A dual head sewing stand, designed for use in closing open-mouth multiwall bags, has been announced by Union Bag-Camp Paper Corp. The unit accommodates either the 80600E or 80600H sewing head. According to the company, the dual head solves the problem of thread breakage, because if one sewing head breaks down, the other head can be swung into place without loss of production. This is done by removing a pin on the sewing stand, swinging the pedestal 180° and then replacing the pin. Another advantage is, the company says, if both a plain sewn closure and a bound-over tape closure are used on the same production line, one position of the stand can be used for the "E" and the other for the "H" head. This eliminates the necessity of changing heads. For more details, check No. 9134 on the coupon and mail.



No. 9124—Bag Flattener

The New London Engineering Co. has introduced a bag flattener. Designated the "Model BB12Ex8 Type 32, the 8 ft. unit is designed to flatten bags as they come from filling machines, to assure firm, safe stacking or palletizing, and storage in the least space possible," the company said. The unit is basically a New London Cost-Cutter Conveyor with an inverted power feeder driven from the snub pulley shaft. The upper belt

Send me information on the items marked:

- ☐ No. 9079—Mikro-Pulverizer
- ☐ No. 9098—Shipping Equipment Booklet
- ☐ No. 9113—Emulsifier Data
- ☐ No. 9124—Bag Flattener
- ☐ No. 9129—Diluent Catalog
- ☐ No. 9133—Bagging Scale
- ☐ No. 9134—Dual Head Stand
- ☐ No. 9135—Automatic Control
- ☐ No. 9136—Stacking Belt
- ☐ No. 9137—Bagging Weigher
- ☐ No. 9138—Diatomite Bulletin
- ☐ No. 9139—Magnetic Separator

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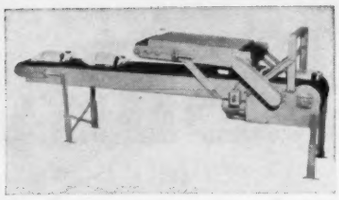


can be adjusted to the desired minimum position above the lower belt and several different bag sizes can be flattened without changing the adjustment. The exact amount of compression required is achieved by adding weight on the shelf on the upper belt. The unit is available in belt widths from 8 in. to 24 in. For details, check No. 9124 on the coupon and mail to this publication.

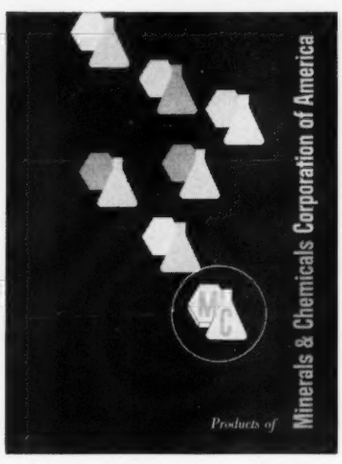
No. 9113—Emulsifier Data

A description of Witco Emcol emulsifiers H-710, H-712 and H-714 for 2,4-D and 2,4,5-T ester concentrates, along with a listing of typical weed-killer formulations, is presented in Emulsol Technical Bulletin No. 55, offered by Witco Chemical Co., Inc.

These emulsifiers are blends of oil soluble amine sulfonates with polyoxyethylene ethers for formulating low foam concentrates. The bulletin says they exhibit marked sludge in-

No. 9129—Diluent Catalog

Minerals & Chemicals Corporation of America has just published a condensed catalog describing its complete line of mineral products. The 8-page, two-color booklet presents the physical and chemical properties of all of the company's standard aluminum silicate pigments, Attapulgus clays,



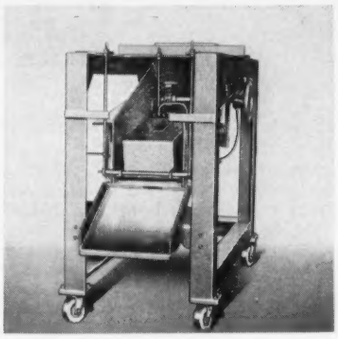
activated bauxites, and limestone products. Physical and chemical characteristics of the various grades of each mineral product are presented in tabular form for ready reference. Typical applications are also described. The condensed catalog also lists the names and addresses of the company's 35 distributors in the United States and Canada. A copy of the condensed catalog may be obtained by checking No. 9129 on coupon.

No. 9079—Mikro-Pulverizer

A small pulverizing unit for pilot plant and small batch use is described in a bulletin just issued by Pulverizing Machinery Division of Metals Disintegrating Co. In pilot plant operations, the "Bantam" model is used for experiments and research where results need to be particularly accurate, its makers state. The unit is dustless, accessible and easy to clean, the bulletin says, and is particularly adaptable to grinding and blending insecticides and similar products. For a copy of the bulletin, check No. 9079 on the coupon and mail to this publication.

No. 9139—Magnetic Separator

Magnetic Engineering & Manufacturing Co. announces MEMCO "High Power Plate Magnets" for removal of tramp iron, and fine contaminating iron from foodstuffs, chemicals, drugs and other materials in belt conveyors,



vibrating conveyors and chutes. A portable suspended plate magnet, with vibrating tray and secondary plate magnet, which can be moved to different locations to operate as a protecting separator for varied products in a single plant having multiple small run lots, is one of the magnets offered. According to company literature, in a typical installation, the product passes under the suspended plate magnet and over a permanent plate magnet for added protection. Check No. 9139 on the coupon and mail to this publication for more details.

No. 9098—Shipping Equipment Booklet

An eight-page, illustrated booklet describing a line of bagging and shipping equipment is being distributed by K. E. Savage Co. The booklet contains information about shipping

bulk shipping feedmill, fertilizer hopper system and fertilizer bulk shipping mill are given. For copies, check No. 9098 on the coupon and mail to this publication.

Flexibility Success in

By Richard Owen*

THE trend today in large scale manufacturing is toward standardization. One is taught constantly that the way to progress is to determine the single "best way," to refine it to the nth degree, to specify procedures by decree, and to follow them to the ends of the earth. "Mechanize, automate, routinize, and reduce to written regulations." Certainly there is no question about the benefits to be attained by methodical evaluation and refinement of existing methods.

But there are two sides to the coin—and the other side is flexibility.

The very search for the best way can result in finding a better way; the constant seeking for standardization results in the continuing call for modification. Without flexibility it is impossible to cope with the constantly changing patterns of problems, procedures, and products.

Few, if any, segments of the American chemical economy demand flexibility as much as does the manufacture and distribution of agricultural chemicals. Problems and markets vary from area to area and from season to season. To meet these situations, a manufacturer must adapt to them, and develop an operating philosophy which will match the challenge of this dynamic industry.

Recognizing that it is impossible to operate a heavy tonnage production system with a product line comprising some 2,000 items, all subject to change without notice, as one would for basic staples such as caustic soda, or sulphuric acid, our company "dividualized" itself.

Some time ago, a fully integrated agricultural chemicals division was organized. Sales and production functions were separated from the various industrial manufacturing divisions, as were certain supporting services, such as accounting, research, credit, etc. The object was to set up a "company within a company"; autonomous but not independent. It would have to cope with its own peculiar problems. It would have to stand on its own feet from a profit and loss standpoint, but it would be free to draw on corporate staff and services such as purchasing, traffic and personnel, but would not duplicate such existing services.

Some of the special problems to be resolved in such a program include:

1. **Inventory management**
2. **Production scheduling**
3. **"Seasonality"**
4. **Formulations development**
5. **Product obsolescence**
6. **Need for high caliber research**

In each of these, the key factor is flexibility.

Consider first the question of inventory. In our case, service was one of the first problems to be attacked. Careful and elaborate finished product stockpiling programs were worked out and followed.

A special effort was made to keep a generous stock on hand of all products which might reasonably be called for. This was successful, but there were drawbacks. The product line comprised over 2,000 items when the different strengths and combinations of dust mixtures and liquid emulsifiables are considered, in the various package sizes, not to mention herbicides, seed treaters, mercurial solutions, flowables, granulars, sulphurs, pastes, and wettable powders.

The result was an inventory build-up involving millions of dollars. Moreover, because of the vagaries of weather, crops, infestations, and customer preferences, it was not possible to close out a season without sizeable quantities of idle stock on hand.

Thus, greater flexibility was needed. A system was evolved based on providing small plants in each major market area, with each plant constructed and equipped in accordance with the needs of its area, from the standpoint of both the product and its marketing.

In building these plants, predominant emphasis was placed on first class, high-capacity producing equipment and controls. Fixed asset investments in structures, land, offices, and frills of all kinds were minimized as far as possible.

The problem of serving customer demand could be now attacked in a different way. Emphasis was placed on getting "ready," rather than attempting to out-guess the market and doing the production job in advance. In regions such as Florida and Texas where a home-owned truck fleet could contribute, fleets were provided. In regions like the Midwest where dispersed systems of warehousing and shipping points were necessary, they were provided. In the Northeast area, where market calls run largely to fine micron particle sizes, a major air milling complex was installed.

The success of the program is indicated through the ability to deliver goods, and also from the standpoint that major sums were released from inventory for other more active use.

There were other benefits hardly less important. Certain materials tend to suffer in storage, so the practice of stocking raw materials and containers, and of shipping freshly produced products, contributed to product quality and reliability. Through this program of stocking raw materials and containers at dispersed units with high production capacity, shipments could be produced

*Eastern Production Manager, Agricultural Chemical Div., Stauffer Chemical Co.

Called Key to Production

and packaged to order and exactly to customer requirements—in many cases during the time that the customer's truck was on the way to the plant.

As the third phase of the inventory program it was found that the policy of flexibility must itself be made flexible. Naturally, in each area there are small numbers of staple commodities which move each year and of course one cannot produce every shipment to order. There must be a planned schedule of authorized stock levels for major moving items so that machinery and manpower will not have to be constantly started and stopped. The sales department was given the responsibility for designating by item the minimum and maximum stockpiles at each plant of the high volume products.

These are based on fractional percentages of actual prior year experience. In this way, production operations could still be programmed for best efficiency, not on a month to month basis but rather on a day to day basis or, if need be, from hour to hour.

Thus the inventory, sales and production programs were all stripped down and dovetailed. One final problem remained: what to do in the off-season. Here again there was no pat answer and the solution depended on the particular location. There were three main approaches:

At some of the smaller insecticide dust-mixing units the problem of "seasonality" was frankly faced. Assuming that these plants will be shut down in the fall and started up in the spring, procurement, hiring, training, maintenance scheduling, etc., were all planned accordingly. The plant manager is also the sales manager responsible for his area. In the summer he spends most of his time filling orders; in the winter he travels and gets new orders.

At the larger plants with roller mills, air mills, etc., while the level of operations and payrolls are reduced, programs are set up to continue operations at a reduced and orderly rate. This is done by producing specialty products, by taking on export business, or in the manufacture of intermediate materials—such as dust concentrates—which will be needed as raw materials at the blending plants in the following year.

In doing so advantage is also taken of the fact that an aging time after grinding and prior to step-down blending is beneficial to field quality in the case of a number of materials.

At certain plants we also conduct non-agricultural operations, and take advantage of our roller milling capacity to meet the needs of various industrial markets. At one location, we operate a sulfur refinery and can shift our manpower from grinding agricultural sulfur to refining for the pharmaceutical, salt block and rubber industries.

Consider the phase of formulation development. Needs will constantly arise for new concentrations or combinations, special solvents, or tailor-made products, or modifications which will fit into a special picture. Accordingly, we maintain well trained and experienced formulation laboratories on both the East and West coasts. In addition to developing, evaluating and furnishing new and modified formulations, these groups stand ready at all times to jump to the aid of production or sales whenever the need arises for special technical service or assistance.

It is neither necessary nor desirable to provide such a group at each plant or to have it under the direct control of either production or sales. These laboratories function on a staff basis from a centralized position and actually operate as an arm of our research division.

It is in the research division that the searchlight of flexibility burns at highest candle power. Probably no other group realizes so fully the need for continuously changing the product line to keep pace and to set the pace. Our research division stations a resident representative in each major marketing region. It is his job to pilot new products from the development stage through field testing, registration, market education and development, and initial sales.

But he also is in an excellent position to furnish technical advice to the local sales office. Too, he is on the spot and can gauge the gaps and the needs of the area, thereby keeping the research team fully posted on the needs of each area.

One of the best ways to beat the problem of product obsolescence is to contribute to it. Along this line the research division in recent years has given us three new products: a fungicide, a wide spectrum insecticide and miticide, and a temporary soil sterilant.

Thus the policy of flexibility runs through management, production, sales, staff services and research. Where the future will lead cannot be predicted. Perhaps the next major move will be into the realm of microbial insecticides. But one thing is sure—we will be flexible and ready to modify to meet the new requirements of this expanding and changing industry.

Fertilizer Manufacturing to Receive Major Attention at Round Table, November 4-6

WASHINGTON — How to solve problems of formulation, granulation, quality control and preneutralization will be told by fertilizer production experts at the annual industry Round Table to be held at the Mayflower Hotel, Washington, Nov. 4-6. The three-day meeting will be completely filled with practical suggestions and advice by men in the field with many years of practical training and experience behind them.

Chairman of the meeting will be Dr. Vincent Sauchelli, chemical technologist of the National Plant Food Institute, Washington. Committee members include H. L. Marshall, Olin Mathieson Chemical Corp., Baltimore; J. E. Reynolds, Jr., Davison Chemical Co., Baltimore; and Albert Spillman, Fertilizer Manufacturers Cooperative, Inc., Baltimore.

A comprehensive discussion on fertilizer plant processes from raw materials to the final bagged product will be carried out by L. V. Clegg and members of the staff of Canadian Industries, Ltd., Chatham, Ont., and Al Henderson, Wilson and Toomer Co., Jacksonville, Fla., on the opening day.

About an hour and a half of the afternoon of Wednesday, Nov. 4, will be devoted to questions and answers related to the morning's talks.

The mechanics of formulation calculations will be handled by a group of four experts. These include W. J. Tucker, GLF Exchange, Ithaca, N.Y.; J. E. Reynolds, Jr.; R. T. Schmalz, F. S. Royster Guano Co., Norfolk, Va.; and H. H. Tucker (not to be confused with W. J. Tucker mentioned earlier), Sohio Chemical Co., Lima, Ohio.

A representative of the Dorr-Oliver Company, New York, will show scale models of chemical plants, pointing out how such models are more simple and more easily understood than are blueprints. Speaker will be W. A. Lutz.

Problems of conventional fertilizer manufacturing will be the general subject of the program for Thursday morning, with Dr. J. O. Hardesty, USDA, Beltsville, Md., discussing the importance of correct mechanical condition of materials, and three speakers covering the use of urea-nitrate solutions. The three will be H. H. Tucker, Sohio Chemical Co.; G. R. Gilliam, Nitrogen Division, Allied Chemical Corp., New York; and J. W. Lewis, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

Dr. Vincent Sauchelli

The problem of segregation will comprise the second part of the Thursday morning program. W. L. Hill, USDA, Beltsville, Md., will talk on the particle size of raw materials, followed by a panel of four covering factors involved in rotary and gravity mixing equipment.

Participating in the latter will be Harold B. Krueger, Stedman Foundry & Equipment Co., Aurora, Ind.; R. E. Robinson, Atlanta Utility Co., Atlanta, Ga.; Walter Sackett, A. J. Sackett & Sons Co., Baltimore, Md.; and R. E. Hefler, Ransom Machinery Co.

Semi-granular mixtures of fertilizers will be the subject for the opening session of Thursday afternoon, with rotary mixers, the Eyman process and block spargers taking the spotlight.

T. R. Schmalz, F. S. Royster Guano Co., Norfolk, Va., will talk on the rotary mixer; George K. Walton, Tennessee Corp., Atlanta, Ga., on the Eyman process; and Joe Sharp, Spencer Chemical Co., Kansas City, Mo. and Elmer Perrine, Nitrogen Division, Allied Chemical Corp., New York, on the new type of block sparger.

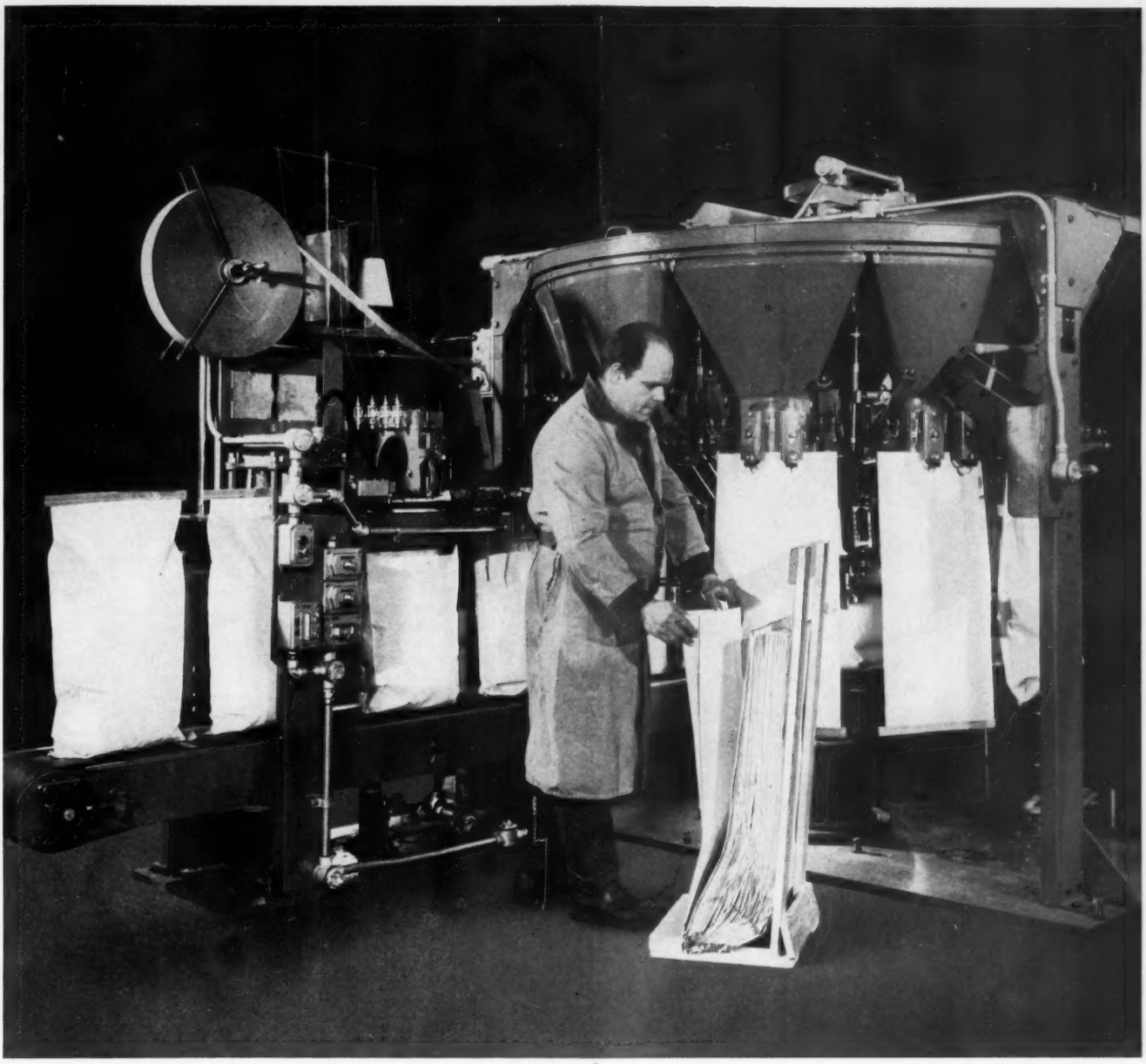
Statistical quality control will be the subject for two speakers. C. H. McCall, Booz-Allen Research, and Vance Ward, Canadian Industries, Ltd.

Preneutralization is the topic scheduled for thorough discussion at the final session, Friday, Nov. 6. Appearing on the program in this portion are G. R. Gilliam, Nitrogen Division; Grant Marburger, Spencer Chemical Co., Kansas City; P. E. Stone, Virginia-Carolina Chemical Corp., Richmond, Va.; Frank G. Keenan, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.; and N. K. Alfrey, Research division, W. R. Grace & Co., Baltimore, Md.

Engineer Appointed

MILWAUKEE, WIS. — Appointment of John C. Orth as an application engineer in the processing machinery department has been announced by Allis-Chalmers.

A chemical engineering graduate of Seattle University, Mr. Orth recently completed Allis-Chalmers training course for graduate engineers. He is a member of the American Institute of Chemical Engineers and the Wisconsin Chemical Engineers Society.



Famous Model "AF" Bagpaker® weighs, fills, settles and closes a 100-lb. bag every 2½ seconds!

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It accurately *weighs* any free-flowing or semi-free-flowing material, quickly *fills* the bag, *settles* it by vibration, automatically *preforms* the top, and *stitches* it tight. You can choose from nine different closures. Bagpak's exclusive "Cushion Stitch," a reinforced two-thread double-lock chain stitch, is standard equipment.

The Model AF Bagpaker is ruggedly constructed of heavy welded steel throughout. Gears are fully enclosed and bathed in oil. Critical parts are of *stainless steel.*

There is a Bagpaker model for every need. They range from the completely automatic Model "A" Bagpaker, capable of packaging up to *60 tons per hour,* to small, manually operated economy models.

Whatever your multiwall packaging needs, it will pay you to talk to your Bagpak sales and service representative.

Bagpak Division **INTERNATIONAL PAPER** New York 17, N. Y.

Far Western Fertilizer Safety School to Draw Personnel from Ten States

FRESNO, CAL.—The fourth of five safety chools sponsored by the National Plant Food Institute and the fertilizer section of the National Safety Council is scheduled for October 29-30 at Fresno, according to Dr. Richard B. Bahme, NPFI Western regional director.

Dr. Bahme emphasized that all fertilizer companies doing business in the Far West are invited to send their plant personnel to the two-day safety school. States included in the scope of the school include Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.

W. C. Creel, chairman of the supervisory training committee of the National Safety Council, will act as chairman of the school and will speak on the importance of preventive measures in safety practices. Orm J. Chinnock of Hercules Powder Co., Hercules Cal., will again be director of the school. Dr. Bahme is assisting with the arrangements.

"Various industry, government and university personnel are featured speakers on the program, and adequate student participation is provided for," Dr. Bahme said. "A group discussion will give all participants at the school the opportunity to present safety problems they would like solved and discuss them among themselves and with school leaders."

T. N. Saunders, chief of the division of industrial safety for the state of California, will lead off the first day of the school with a review of fertilizer industry accidents in California during the past year, outlining causes and effects. Safety attitudes and personal factors in safety will be the topic of a talk by Hugo Riemer, executive vice president of U.S. Borax and Chemical Corp., Los Angeles.

Other highlights of the school include a presentation of various safety education programs now underway in industry and instruction on safety which is available in colleges; a discussion of the foreman's safety job; and a panel on safety practices for fertilizer dealers and users.

Previous schools have been held in Ithaca, New York; Chicago, and Atlanta. Reports from the previous meetings indicate excellent instruction being given, opportunities for exchanges of ideas and experiences, and expert leadership.

Following the Fresno meeting, one additional safety school is scheduled to round out the regional series. It is scheduled for Nov. 12-13 at the Topicana Motor Hotel, Pasadena, Texas.

California Fertilizer Convention Plans Told

Vince Barnett, Hollywood comic and raconteur, will be one of several featured speakers during the 36th annual convention of the California Fertilizer Assn., to be held at the Fairmont Hotel, San Francisco, Nov. 9-11.

Thomas Fleischman, director of western operations, St. Regis Paper Co., San Francisco, and chairman of the convention program committee, said that other featured speakers will include Dr. Russell Coleman, executive vice president, National Plant Food Institute, Washington, D.C., and Joseph Burger, director of public relations, H. V. Nootbaar & Co., Pasadena.

The business meeting will feature reports by Howard H. Hawkins, association president, Golden State Plant Food Co., Glendora; Sidney H. Bierly, general manager, Sacramento; Millard E. McCollam, chairman, CFA soil improvement committee, and western states manager of American Potash Institute, San Jose; Dr. Coleman, and Mr. Burger. Mr. Barnett will speak following luncheon in the Venetian Room on Nov. 9.

At the business session that morning four directors will be elected to three year terms, one to a two year term, and one for one year. Officers will be chosen by the new board of directors for 1960. Budgets for CFA operation, and for the soil improvement committee program will be presented for approval.

On the morning of Nov. 11, the assembled convention will participate in a panel discussion on the subject of the convention theme, "Technical Progress and Business Stability." Panel moderator will be R. L. Luckhardt, vice chairman of the soil improvement committee, of Collier Carbon & Chemical Corp., Los Angeles. Members of the panel will include Floyd Hornibrook, the Best Fertilizers Co., Lathrop; Dr. Guy F. MacLeod, Sunland Industries, Fresno; Dr. Malcolm H. McVickar, California Spray-Chemical Corp., Richmond; Larry M. Roberts, Shell Chemical Corp., San Francisco; James F. Sloan, J. F. Sloan Co., Salinas, and William E. Snyder, Wilbur-Ellis Co., Los Angeles.

The ladies' bridge and canasta tournament will be held on Nov. 9 in the afternoon.

The entire day of Nov. 10 will be given over to recreation. Features will include ladies' and men's golf tournaments, and a bowling tournament. A cocktail hour and luncheon, sponsored by the association, will be held that day in the English Room, Canterbury Hotel, a feature of which will be a fashion show.

The annual banquet will be held on the evening of Nov. 11 in the Gold Room of the Fairmont Hotel. Ray Hackett and his 10 piece orchestra will provide dance music, and Genie Stone will entertain. Awards will be made here to the winners of competitive events, and there will be several ladies' door prizes, too.

Assisting Mr. Fleischman and his program committee in development of program and entertainment are committees headed by Mrs. A. L. Diebolt, Los Altos, and Robert E. Segerdell, Hercules Powder Co., San Francisco.

$4 Million Expansion Program Over Five Years Is Announced by Thompson-Hayward

EXPANSION PROGRAM—Artist's conception of Thompson-Hayward's proposed facilities near Kansas City.

KANSAS CITY, MO.—Plant, warehouse and headquarter operations of the Thompson-Hayward Chemical Co. at Kansas City will be consolidated on a recently acquired industrial tract in Wyandotte County, Kansas, under a five year program now underway, the company has announced. The entire program will require an expenditure in excess of $4,000,000, with $2,500,000 being spent in the initial phase for new offices, warehouses and one of six plants eventually to be moved to the new site, Robert S. Thompson, president, has announced. The first units are scheduled for completion in the early fall of 1960.

Thompson-Hayward distributes industrial, agricultural, laundry and feed chemicals, as well as manufacturing herbicides emulsifiers and a variety of chemical specialties. After a modest start in 1917, Thompson-Hayward's chemical operations now cover a 20 state midwestern area and produce sales in excess of $35,000,000.

The company operates 18 branch facilities, all of which include office and distribution space. In addition to Kansas City, plants for manufacture are located at New Orleans and Lubbock, Texas.

A considerable amount of expansion and modernization of facilities at all branch locations has taken place since World War II.

Completion of the extensive program at Kansas City will more than double present executive and general office space here.

Formulation, Corrosion, Panel Discussions Set for National Fertilizer Solutions Meeting

ST. LOUIS, MO.—The 1959 convention of the National Fertilizer Solutions Assn. is all set for Nov. 8-10 at the Statler-Hilton Hotel, St. Louis, according to information from the association's headquarters in Chicago.

An equipment show; sessions in which solutions and suspensions will be discussed; topics covering green acids, formulations, corrosion, and a panel discussion on nitrogen, phosphates and potash are features of the three-day conference.

O. L. Ohnstad, Ohio Liquid Fertilizer Co., South Solon, Ohio, NFSA president, will deliver his address on Monday morning, Nov. 9, to open the convention.

Two speakers will talk on solutions and suspensions at the Tuesday morning session Nov. 10. Participating in this program will be W. S. Newsom, Jr., Research Engineering & Development Division, International Minerals & Chemical Corp., Skokie, Ill., and Edgar W. Sawyer, Jr., research supervisor of Minerals & Chemicals Corp. of America, Menlo Park, N.J.

H. H. Tucker, Sohio Chemical Co., Lima, Ohio, will talk on formulations; and Murry McJunkin, United States Steel Corp., Pittsburgh, Pa., will discuss various aspects of corrosion as it pertains to fertilizer solutions.

A panel discussion on nitrogen, phosphates and potash will bring out facts on supplies for 1959 and subsequent years. Scheduled to take part in this phase of the Tuesday program, Nov. 10, are J. E. Tuning, Spencer Chemical Co., Kansas City, Mo., who will talk on nitrogen; James L. Brown, Monsanto Chemical Co., St. Louis, Mo.; and Dr. Edwin C. Kapusta, United States Potash Co., division of United States Borax & Chemical Corp., New York. Dr. Kapusta will talk on potash.

The afternoon session will be in the form of a "Town Hall" meeting, according to the advance program. Moderator will be Robert A. Lemler, Nitrogen Division, Allied Chemical Corp. Taking part in the panel discussion will be Edwin C. Aylward, Aylward Fertilizer Co., Sullivan, Ill.; E. E. Crouse, C. D. Liquid Fertilizer Co., Liberty, Ind.; L. T. Stone, Goodpasture Grain & Milling Co., Brownfield, Texas; Edward A. Wex, Badgerland Liquid Fertilizer Corp., Milwaukee, Wis.; Nelson D. Abell and Morris Woolsley.

Association members have been supplied blanks on which they may outline problems to be discussed at the "Town Hall" session. This portion of the program will be built around the questions submitted.

An afternoon program devoted to sales problems is on the agenda for Tuesday afternoon, Nov. 10, with conference rooms open for consultations with suppliers and others.

The annual dinner is scheduled for Tuesday evening at 7, with introduction of new officers named at the meeting, and ceremonies in connection with the annual "Man of the Year" award.

The association has listed the following firms which have reserved conference rooms in connection with the meeting:

Allied Chemical Corp.; Alton Bottled Gas Co.; Badger Meter Mfg. Co.; Barnard & Leas Mfg. Co.; John Blue Co.; Campbell Mfg. Co.; J. C. Carlile Corp.; Delavan Mfg. Co.; Dempster Mill Mfg. Co.; The Deming Co.; Eastern Steel Products Corp.; Even Spred; and Food Machinery & Chemical Corp.

Gates Rubber Co.; General Metals; Gorman Rupp Co.; Hanson Equipment Co.; Hahn, Inc.; Hypro Engineering Co.; Marine Products Co.; Marlow Pumps; Monsanto Chemical Co.; Plant Food Equipment Co.; and Pollard Mfg. Co.

Sohio Chemical Co.; Spencer Chemical Co.; Spraying Systems Co.; Standard Steel Mfg.; Tokheim Corp.; Tryco Mfg. Co.; U.S. Rubber Co.; U.S. Steel Corp.; and Victor Chemical Works.

Made Division Manager

ST. PAUL, MINN. — Roger Olmsted, plant manager of Northwest Cooperative Mills fertilizer and phosphate plants at Green Bay, Wis., has been promoted to manager, fertilizer division with headquarters in St. Paul, Minn. The appointment was effective Oct. 1.

E. E. Smith

APPOINTED—E. E. Smith has been appointed manager of Climax Molybdenum Company's chemical division, it was announced by Reuel E. Warriner, vice president, sales. In his new post, Mr. Smith will direct all chemical sales and development activities for Climax. This covers a wide range of materials including agricultural chemicals and numerous intermediate and development chemicals. Mr. Smith previously served the company as manager of chemical sales, a post he held for two years. He joined Climax in 1955.

Current Pesticide Problems Up for Discussion at NAC's Twenty-Sixth Convention

WASHINGTON—Manufacturers of pesticides from across the nation met with marketing experts, governmental officials, and representatives of colleges and experiment stations at the 26th annual meeting of the National Agricultural Chemicals Assn. at the French Lick-Sheraton Hotel, French Lick, Ind. Oct. 21-23.

In keeping with some of the current problems facing the pesticide industry, the convention program called for talks on sales and marketing, advertising and promotion of pesticidal materials; a panel on the effect of pesticides on wildlife; a presentation on the function of the association in working for the industry; a report on world pest control developments and two talks on the 1959 amendment to the Federal Insecticide, Fungicide and Rodenticide Act and other Federal legislation.

The meeting agenda, as announced prior to the convention, called for the opening sessions to be in charge of Jack V. Vernon, vice president, Niagara Chemical Division, Food Machinery & Chemical Corp., Middleport, N.Y., NAC president. Mr. Vernon was to present his presidential address in the morning session of Wednesday, Oct. 21, according to the program.

Dr. Roger Roth, Velsicol Chemical Corp., Chicago, general committee chairman of the meeting, was to call the convention to order. Two talks on sales and advertising were also included in the morning program for Wednesday.

Robert S. Thompson, president, Thompson-Hayward Chemical Co., Kansas City, Mo., was assigned the topic of "Sales and Marketing of Pesticides" while Louis F. Czufin, manager of the advertising division of California Spray-Chemical Corp., Richmond, Cal., was to speak on "Advertising and Promotion of Pesticides."

Final event of Wednesday morning, according to the program, was a panel discussion on pesticides and wildlife. Moderator of the panel was Jack Dreessen, NAC Assn., Washington.

Four well-qualified participants comprised the panel. They included Walter W. Dykstra, staff research assistant, branch of wildlife research, U.S. Fish and Wildlife Service, Washington, D.C.; Charles H. Callison, secretary of the National Wildlife Federation, Washington; Dr. Charles Lincoln, head of the department of entomology, University of Arkansas, Fayetteville, Ark.; and Clarence H. Hoffman, assistant director, entomology research division, Agricultural Research Service, USDA, Beltsville, Md.

Luncheon speaker for Wednesday noon was Dr. Earl L. Butz, dean of the college of agriculture, Purdue University, Lafayette, Ind.

An association staff forum was held in the afternoon, giving members an opportunity to discuss current topics with association leaders and to ask questions of staffers.

The annual banquet program called for a talk by Dan C. Anderson, on "Chemical Magic in Action."

Friday morning's activities included a panel of NAC Assn. committee chairmen, with Lea S. Hitchner, executive secretary, as moderator. Participating on the program were Louis G. Gemmell, Geigy Agricultural Chemicals, Inc., Ardsley, N.Y., chairman of the NAC legislative committee; Arthur Northwood, Jr., Shell Chemical Corp., New York, chairman of the NAC public relations committee; George L. Wilson, Jr., chairman, NAC traffic committee; George T. Scriba, Union Carbide & Chemical Corp., New York, chairman, NAC lawyers committee; and F. Ray Barron, Jr., American Cyanamid Co., New York, secretary, NAC technical advisory committee.

World pest control developments were to be discussed by Dr. Charles E. Palm, dean of the college of agriculture, Cornell University, Ithaca, New York.

Final events on the Friday morning program were two talks bringing into focus the 1959 amendment to the Federal Insecticide, Fungicide and Rodenticide Act. Justus C. Ward, chief of the pesticide regulation branch of the Agricultural Research Service, USDA, Washington, was to present the first paper on the subject, followed by a talk by Joseph A. Noone, technical adviser of the NAC Assn., Washington.

Committee meetings, a golf tournament and fashion show, the latter for the ladies present, comprised a larger portion of the day's activities for Thursday, Oct. 22. The annual banquet was held that evening.

Lea S. Hitchner

PLANS PRODUCTION UNIT

VICKSBURG, MISS.—W. A. Johnston, works manager of Spencer Chemical Co. plant here, has announced the promotion of George Norman to field tank service supervisor. He will report to Elmer Palmer, manager of rail cars and tank service, in Kansas City. Mr. Norman has been with Spencer for six years, most of which time was spent at the Vicksburg works.

PRODUCTION EDITION

Editorial

Round Table Meeting Contributes Much to Technology of Fertilizer Manufacturing

TECHNOLOGICAL PROGRESS in the fertilizer industry has been very pronounced during the past several years. Refinements in processes already known, plus new concepts and innovations in manufacturing procedures, have advanced the trade to a position of importance in the chemical industry. There have been numerous factors responsible for this.

Certainly one of the most noteworthy of these influences is the fertilizer industry Round Table conducted in Washington each fall. This event, starting out only a few years ago as a small group of fertilizer people, has blossomed into a major industry event occupying a three-day schedule and attracting hundreds of fertilizer production people from all parts of this country as well as from areas outside the U.S.

This year's Round Table scheduled for Nov. 4-6 at the Mayflower Hotel in Washington, promises to be an exceptionally practical one. Not only are new ideas to be covered in the discussions, but a considerable amount of attention is also being given to procedures involved in the production of conventional plant food products.

Dr. Vincent Sauchelli, guiding light of the Round Table since its inception, has remarked that the major tonnage of fertilizer consumed in the U.S. is still of the conventional type, which should have an almost universal appeal to personnel from the hundreds of plants turning out this type of product.

Those attending this year's sessions will hear discussions on problems of segregation, particle size, mechanical condition of mixed products, and different means of mixing plant food ingredients to grade.

But that is by no means all they'll hear. One comprehensive subject covers plant processes from raw materials to the completed product; another, the mechanics of formulation calculations; another on statistical quality control, and still another on preneutralization.

Reports on discussions, summaries of talks and complete papers presented at the Round Table will be presented in Croplife and the Production Edition, so that those unable to attend might get an overall view of the proceedings . . . but by far the most effective means of gaining benefit from the Round Table is to be present in person.

Opportunities are abundant for informal discussions not only with experts who appear on the program, but also with fellow production people who may have overcome problems currently bothering others. The 500 or more persons attending the Round Table represent several thousand years of practical experience, and much of this may be available by just talking to these fellows at the meeting.

We hope that additional numbers of production personnel may be on hand to gain the benefits of the Round Table in person this year. It is not too late to decide to go. Hope to see you there.

★ ★ ★

SPEAKING OF MEETINGS, the National Fertilizer Solutions Assn. will conduct its annual convention in St. Louis Nov. 8-10. This meeting, like its predecessors, also promises a great deal in the way of instruction for the liquid fertilizer manufacturer.

Topics including solutions and suspensions will be thoroughly discussed; there will be talks on formulations and also discussions on corrosion problems. One valuable feature of the program will be a "Town Hall" type of session wherein production questions will be tackled by a panel of experts.

Still another session will be devoted to discussions on nitrogen, phosphates and potash, with many helpful tips on how to handle, store, and ship these materials.

Sound interesting to you? These and other national and regional conferences are well worth the time and expense of attending. Note the meeting calendar on the opposite page and make plans to look in on at least one of the conventions listed!

Safety a Matter of Attitude and Spirit

A PLEA for greater participation in plant safety and for increased efforts toward this end was made by William E. McGuirk, Jr., president of Davison Chemical Division of W. R. Grace & Co. recently. In a guest editorial appearing in the "Grace Sentinel," a house magazine stressing safety, Mr. McGuirk wrote:

"Safety is an intangible, yet its influence for good or bad affects nearly every act of our daily lives. From our first waking moment to the darkness of bedtime, we live each day challenged by this intangible threat.

"It cannot be weighed or felt, measured or touched because safety is a matter of attitude and spirit. The spirit that brings an outstanding safety program to a plant is one of thoughtful individual responsibility.

"It is a recognition that our hands, heads, and hearts are our gifts from the Good Lord to be used carefully for the material and spiritual support of ourselves and our families as well as for the good of our fellow men. It is a recognition that in our attitude toward our fellow workers, ill will, temper, thoughtlessness and selfishness inevitably beget accidents.

"A responsibility of management certainly is to provide a plant where men filled with the true spirit of safety can work safely in association with their fellow workers. The managers of Grace continuously and earnestly solicit the help of their fellow workers in discovering and eliminating hazards to safety. In such a combined effort accident-free safety records can be achieved."

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Industry Meetings

Oct. 29-30—Far West Fertilizer Safety School, Hacienda Motel, Fresno, Cal.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.; Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 5-6—Far West Fertilizer Safety Training School, Fresno, Cal.

Nov. 8-10—National Fertilizer Solutions Assn., annual convention, Statler Hilton Hotel, St. Louis, Mo.

Nov. 9-11—36th Annual Convention, California Fertilizer Assn., Fairmount Hotel, San Francisco, Cal.

Nov. 12-13—Southwest Fertilizer Safety School, Tropicana Motor Hotel, Pasadena, Texas.

Nov. 30-Dec. 4—27th Exposition of Chemical Industries, New York Coliseum, New York.

Dec. 2-3—Missouri State Fertilizer Conference, Columbia, Mo.

Dec. 7-10—Western Canadian and North Central Weed Control Conferences, Royal Alexandra Hotel, Winnipeg, Man., Canada.

Dec. 7-11—Nebraska Fertilizer Institute anhydrous ammonia workshops, Dec. 7, Lincoln, Neb.; Dec. 8, Hastings, Neb.; Dec. 9, Ogallala, Neb.; Dec. 10, Kearney, Neb.; Dec. 11, Columbus, Neb., Agricultural Ammonia Institute cooperating.

1960

Jan. 12-13—Nebraska Fertilizer Institute annual convention, Pershing Auditorium, Lincoln, Neb.

Jan. 13-15—Ninth annual convention, Agricultural Ammonia Institute, Statler Hilton Hotel, Dallas, Texas.

EMULSIONS

Continued from page 19

emulsifiable systems requires a radical change in emulsifier composition. However, good agricultural emulsifiers have built-in safeguards against this type of sensitivity.

Application practices vary widely from one marketing area to another. Airplane applicators use much less water in forming an emulsion than do operators of ground equipment. In some areas, the amount of dissoved minerals in the water is greater than in others. Water temperatures may vary considerably both from area to area and from one time of year to another. (Any one who has had to wash with cold rather than warm water appreciates the influence of temperature on the effectiveness of a surface-active agent.)

In addition to taking into account all of these considerations, the formulation chemist faces another critical task. He must find out exactly what performance is required of his product, so that he can correlate laboratory tests as closely as possible with field conditions. Accordingly, he should work closely with the sales and market development groups in order to get a realistic picture of the performance required.

Generally, it is wise for marketing and sales management to assemble field requirement information that is as complete as possible. To spend valuable time formulating a product which is never sold because one of the standard items in the existing product line can be used in its place is unfortunate, but not unheard of.

Table I lists the most frequently evaluated performance characteristics of emulsifiable concentrates and also indicates the laboratory test method generally used to check performance.

Almost all emulsifiers in current use are anionic-nonionic blends. Usually, the anionic fraction is an oil-soluble salt of dodecyl benzene sulfonic acid, with the nonionic fraction of the polyoxyethylene type. Blending the anionic and nonionic portions together results in emulsion properties not possible with either anionic or nonionic emulsifiers alone. The blend produces emulsifiable concentrates with a very high "bloom" or spontaneity of emulsification as seen in Illustration No. 1.

By altering the ratio of anionic to nonionic, the emulsifier can be adjusted to provide peak-performance in a wide number of pesticides, and therefore permit efficient emulsification at low use levels. Altering the anionic-nonionic ratio also allows the formulator to compensate for variation in the field conditions under which the concentrate will be used. With matched-pair emulsifiers, the ratios can be varied quite easily.

Table II points up the wide range of properties that can be obtained through the use of a single matched pair of emulsifiers.

New pesticides based on functional groups other than the traditional chlorinated hydrocarbons are requiring the development of new classes of surface-active agents. Very likely, within the next five years, a large portion of the agricultural emulsifier market will be taken by products with components now in the research laboratory. Selz and Lindner (Journal of Agric. and Food Chemistry, August, 1959) have reviewed some of the approaches used in formulating the new pesticides.

The challenge to improve the horse-and-buggy emulsifiers that faced the colloid chemist ten years ago exists again in a new form today. Within the next five years he will be required not only to develop new surfactant molecules for the new pesticides, but once again to integrate them into the most efficient emulsifiers possible.

TABLE 2

Relation Between Anionic-Nonionic Ratio and Emulsion Performance

Increasing the ratio of anionic to nonionic will:	Increasing the ratio of nonionic to anionic will:
Improve performance in soft water.	Improve performance in hard waters.
Further a tendency toward free oil separation if the ratio is increased too far beyond that required for peak performance.	Increase cream volume as the concentration of nonionic is raised beyond that required for optimum performance although tendency to form free oil remains at a minimum.
Provide better emulsion stability at lower use concentrations (5:95).	Improve emulsion stability at higher use concentrations (10:90).
Improve performance in cool water.	Improve performance in warmer waters.
Improve spontaneity.	Increase aging stability of a concentrate.

A deficiency of the nonionic fraction produces emulsions which may show free oil separation on standing and may have poor aging stability. A deficiency of the anionic produces emulsions with relatively high cream volume but which are easily redispersed. In general, it is safer to formulate slightly higher on the nonionic side. For emulsions used at high use concentrations, such as 10:90, a larger amount of nonionic will be required than for concentrates used at lower use dilutions such as 3:97 or 5:95.

It is significant that accelerated aging tests carried out under extreme conditions, such as steel immersed in an emulsifiable concentrate at 140° F., will cause an apparent depletion of the nonionic portion of the emulsifier blend. For longer aging stability, the nonionic portion should be increased. This may impair performance slightly in softer waters but will insure good product life and good performance in harder waters as the product ages.

The emulsion stability of a formulation should always be tested, preferably in hard waters, after the product has aged, to check for the development of non-emulsifiable oil break as the product ages.

QUESTIONS

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simply made to make the handling of these materials as safe as possible.

Some dust diluents contain appreciable amounts of free silica. Certain small-sized particles of silica will produce "silicosis," a serious lung disorder, if inhaled over a prolonged period. Silica particles in the air should be reduced to safe amounts by management but effective masks will be a decided safeguard to workers in either case.

Masks should be effective and approved for the use involved. Refills or filters should be available for changing when necessary, probably every morning. Each worker should have his own mask and be held responsible for its cleanliness.

Speaking of fumes, some solvents give off vapors more harmful than a slight odor of active ingredient. Inhalation of solvent fumes, when they are strong, is to be avoided. They can be very potent.

There is really nothing to fear in handling poisonous insecticidal materials if the hazards are known and common sense is used. They must always be treated with respect, however, and in some cases masks are an absolute necessity.

INDEX OF ADVERTISERS

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Sulfuric Acid Plant under Construction in Canada

WINNIPEG — Construction of a sulphuric acid plant at Transcona on the eastern outskirts of Winnipeg started Oct. 12. The $1 million plant will be the only one of its type between Sudbury, Ont., and Ft. Saskatchewan, Alta. It will be built for Border Chemical Co., Ltd. of Winnipeg, a newly-formed company of which M. G. Smerchanski of the Manitoba capital is president. The new company is being financed by Canadian and United States interests.

Mr. Smerchanski states that the plant will produce sulphuric acid for use in greater Winnipeg industry at a lower price than for acid now shipped into the area. He said there would definitely be a fertilizer plant coming into the province.

The plant is to be built by Chemical Construction Corp., New York. It will be operated by that firm until a local staff has been trained to take over operations.

Why Illini Phosphate Company selected an H-25 PAYLOADER®

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Harry Lange, foreman, summed up the reasons for their decision, "The H-25 had a lot of advantages in getting in and out of boxcars and getting around to the different fertilizer bins. The other was too slow and sluggish."

William Scott, operator, added, "The H-25 is quicker on the lift, dump and go, gets into smaller places, has more power and digs-in faster to get quick, full loads.

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